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October 2013

LINDALE RELIEVER ROUTE
US 69/Loop 49 North Lindale Reliever Route
Smith County, Texas

DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)

Submitted Pursuant to 42 US 4332 (2)(c)
by the
U.S. Department of Transportation (USDOT),
Federal Highway Administration (FHWA),
and the
Texas Department of Transportation (TxDOT)

Cooperating Agency:
U.S. Army Corps of Engineers

10/21/2013
Date of Approval

for the Federal Highway Administration

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Date of Approval

for the Texas Department of Transportation

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The public comment period will close January 20, 2014. Comments submitted by mail should be directed to Mr. Carlos Swonke, Director of the TxDOT Environmental Affairs Division at the above address. Comments will also be accepted by e-mail to TYL_LindaleRelieverRoute@txdot.gov.

Abstract: The Texas Department of Transportation (TxDOT) proposes to construct a new location, full control of access reliever route around the city of Lindale in Smith County, Texas, referred to as U.S. Highway (US) 69/Loop 49 North Lindale Reliever Route (Lindale Reliever Route). The proposed action is intended to provide relief to the existing US 69 through the city of Lindale and extend a proposed toll facility (Loop 49 West) from IH 20 southwest of Lindale to US 69 north of Lindale. This proposed facility would extend north from the completed Loop 49 West terminus at IH 20, bypassing Lindale and terminating at US 69 north of Lindale. The proposed action was developed, analyzed and vetted through an extensive feasibility and routing process which included many public involvement opportunities from 1999 through the 2013 date of this Draft Environmental Impact Statement (DEIS). The proposed project began National Environmental Policy Act (NEPA) compliance activity as an Environmental Assessment (EA) and was elevated to an Environmental Impact Statement (EIS), due in part to controversy regarding proximity of western alternative corridors to the city of Hideaway and eastern alternative corridors to the city of Lindale and youth camp facilities.

Over the course of three steering committee meetings, four public meetings, two public scoping meetings, three public participating agency meetings and three affected property owner meetings, a technically preferred alignment with broad support was identified (Alternative G). Alternatives to the proposed action include taking no action or building alternative alignments D or G, which range in length from 7.0 to 7.4 miles, respectively. Alternatives D and G would both be new location roadways consisting of a four-lane divided freeway ultimate section in a usual minimum 450-foot right-of-way. The project would most likely be built in phases, with an interim design consisting of a two-lane section. Neither the interim nor ultimate design provides for continuous access roads. Alternative G is identified as the technically preferred alternative primarily due to fewer impacts to the human environment. Environmental impacts caused by the construction and operation of the proposed roadway would vary according to the alignment utilized. Direct impacts of the build alternatives would include construction detours, construction traffic, air and noise impacts from construction equipment and operation of the roadway, surface water impacts from construction activities and roadway storm water runoff, impacts to waters of the U.S. including wetlands from right-of-way encroachment, impacts to wildlife habitat, impacts to cultural resources, and impacts to residents and businesses based on potential relocations. The project alternatives, including no action, would have indirect and cumulative impacts on the environment. The build alternatives would also result in safety, mobility, and capacity improvements to the regional transportation system that would not be provided by the No Build Alternative.

Comments on this DEIS are due by **January 20, 2014, and comments should be sent to:**

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125 E. 11th Street
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The following person may be contacted for additional information concerning this Draft Environmental Impact Statement (DEIS):

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Abstract

The Texas Department of Transportation (TxDOT) proposes to construct a new location, full control of access reliever route around the city of Lindale in Smith County, Texas, referred to as U.S. Highway (US) 69/Loop 49 North Lindale Reliever Route (Lindale Reliever Route). The proposed action is intended to provide relief to the existing US 69 through the city of Lindale and extend a proposed toll facility (Loop 49 West) from IH 20 southwest of Lindale to US 69 north of Lindale. This proposed facility would extend north from the completed Loop 49 West terminus at IH 20, bypassing Lindale and terminating at US 69 north of Lindale. The proposed action was developed, analyzed and vetted through an extensive feasibility and routing process which included many public involvement opportunities from 1999 through the 2013 date of this Draft Environmental Impact Statement (DEIS). The proposed project began National Environmental Policy Act (NEPA) compliance activity as an Environmental Assessment (EA) and was elevated to an Environmental Impact Statement (EIS), due in part to controversy regarding proximity of western alternative corridors to the city of Hideaway and eastern alternative corridors to the city of Lindale and youth camp facilities.

Over the course of three steering committee meetings, four public meetings, two public scoping meetings, three public participating agency meetings and three affected property owner meetings, a technically preferred alignment with broad support was identified (Alternative G). Alternatives to the proposed action include taking no action or building alternative alignments D or G, which range in length from 7.0 to 7.4 miles, respectively. Alternatives D and G would both be new location roadways consisting of a four-lane divided freeway ultimate section in a usual minimum 450-foot right-of-way. The project would most likely be built in phases, with an interim design consisting of a two-lane section. Neither the interim nor ultimate design provides for continuous access roads. Alternative G is identified as the technically preferred alternative primarily due to fewer impacts to the human environment. Environmental impacts caused by the construction and operation of the proposed roadway would vary according to the alignment utilized. Direct impacts of the build alternatives would include construction detours, construction traffic, air and noise impacts from construction equipment and operation of the

roadway, surface water impacts from construction activities and roadway storm water runoff, impacts to waters of the US including wetlands from right-of-way encroachment, impacts to wildlife habitat, impacts to cultural resources, and impacts to residents and businesses based on potential relocations. The project alternatives, including no action, would have indirect and cumulative impacts on the environment. The build alternatives would also result in safety, mobility, and capacity improvements to the regional transportation system that would not be provided by the No Build Alternative.

Comments on the DEIS are due 45 days from the date the Notice of Availability (NOA) is published in the Federal Register. Comments should be sent by mail to TxDOT at the address listed above or by email to TYL_LindaleRelieverRoute@txdot.gov.

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Executive Summary

Introduction

This Draft Environmental Impact Statement (DEIS) is intended to provide a detailed description of the project planning process for the U.S. Highway (US) 69/Loop 49 North Lindale Reliever Route (Lindale Reliever Route), resulting in the identification of a preferred project design and roadway alignment. This preferred alternative was indentified from a set of reasonable alternatives based on its ability to meet the need for and purpose of the proposed transportation improvements while minimizing impacts to the natural, physical, and social environments. The project is proposed by the Texas Department of Transportation (TxDOT) and is being developed in accordance with the Federal Highway Administration's (FHWA) rules and regulations for implementing the National Environmental Policy Act (NEPA).

Description of the Proposed Action

TxDOT proposes to construct the Lindale Reliever Route roadway facility in Smith County, Texas (CSJ 0190-04-033) (**Figure ES-1**). The proposed action would involve construction of a new location, four-lane divided freeway (ultimate section) within a usual minimum 450-foot right-of-way (required to accommodate extensive earthwork needed for the facility). As a result of a Value Engineering study, an interim design for phased construction was recommended consisting of a two-lane facility within the right-of-way. Construction of the proposed interim improvement has a current let date of September 2016 (with an anticipated completion of construction date of December 2018). If one of the build alternatives were selected, the proposed project would be approximately 7.0 or 7.4 miles in length (for Alternatives D and G, respectively) and would serve as a connector/continuation between the Loop 49 West and US 69. The proposed project is estimated to cost approximately $82.3 million (with a construction cost of $63.0 million). With the organization of the North East Texas Regional Mobility Authority (NET RMA) in 2004, additional funding methods were introduced to the project, including tolling the facility. The project will be funded with toll revenue bonds. The North East Texas Regional Mobility Authority has committed to issue these bonds and construct the Lindale Reliever Route as their next expansion of the toll system.

Project Need and Purpose

The project need and purpose was approved by the FHWA on April 3, 2007, and is described in detail in **Chapter I**. The proposed project would address the following needs: safety, system linkage, and capacity. The purpose of the proposed project would be to address the stated needs

by improving safety, increasing regional mobility, and providing capacity to meet future traffic demands and volumes along the existing US 69 roadway.

The existing US 69 facility meets current roadway design standards; however, the facility is considered deficient with respect to its low operating speeds, limited capacity and safety concerns associated with mixing high speed through traffic with local low speed traffic and turning traffic. Construction of the Lindale Reliever Route would address these safety issues by providing an alternative, higher speed route for use by through traffic, thereby reducing future congestion on US 69 through Lindale.

The Lindale Reliever Route would be an important link in Tyler's integrated regional transportation network, ultimately becoming part of a loop around the City of Tyler. The southern and western sections of the Loop (Loop 49 South and West) are toll roads, and the proposed Lindale Reliever Route facility would be an extension of Loop 49 continuing north and tying into existing US 69 north of Lindale (Loop 49 North). Segments 1 and 2 (the southern portions of Loop 49) opened in August 2006 and January 2008, respectively. Segments 3A and 3B (the western portions of Loop 49 south of the Lindale Reliever Route) opened in November 2012 and March 2013, respectively.

Traffic projections conducted for the existing US 69 and the proposed reliever route show an improved volume to capacity ratio on existing US 69 through Lindale if through traffic is diverted to the reliever route.

Construction of the Lindale Reliever Route would fulfill the needs to improve safety, improve mobility in the regional transportation system by linking Loop 49 to existing US 69 north of Lindale, and provide additional overall capacity for traffic moving through the Lindale area.

Project History, Agency Coordination and Public Involvement

Throughout the history of this project's planning process, agency coordination and public involvement have been integral elements of the environmental analysis of alternative roadway alignments. The TxDOT Tyler District began studying the feasibility for a reliever route for US 69 in the city of Lindale in 1999. Completed in 2001, the feasibility study evaluated the possible environmental impacts of various design alternatives for the reliever route (TxDOT, 2001b). The feasibility study recommended that the Lindale Reliever Route should extend north from the future Loop 49 West terminus and tie into US 69 north of the city of Lindale. In 2004 an additional route was added further to the west in response to development that had occurred on the west side of Lindale since the completion of the feasibility study as well as the potential for tolling. Feasibility studies conducted to date were summarized in a Draft Corridor Summary Report in 2005 (TxDOT, 2005).

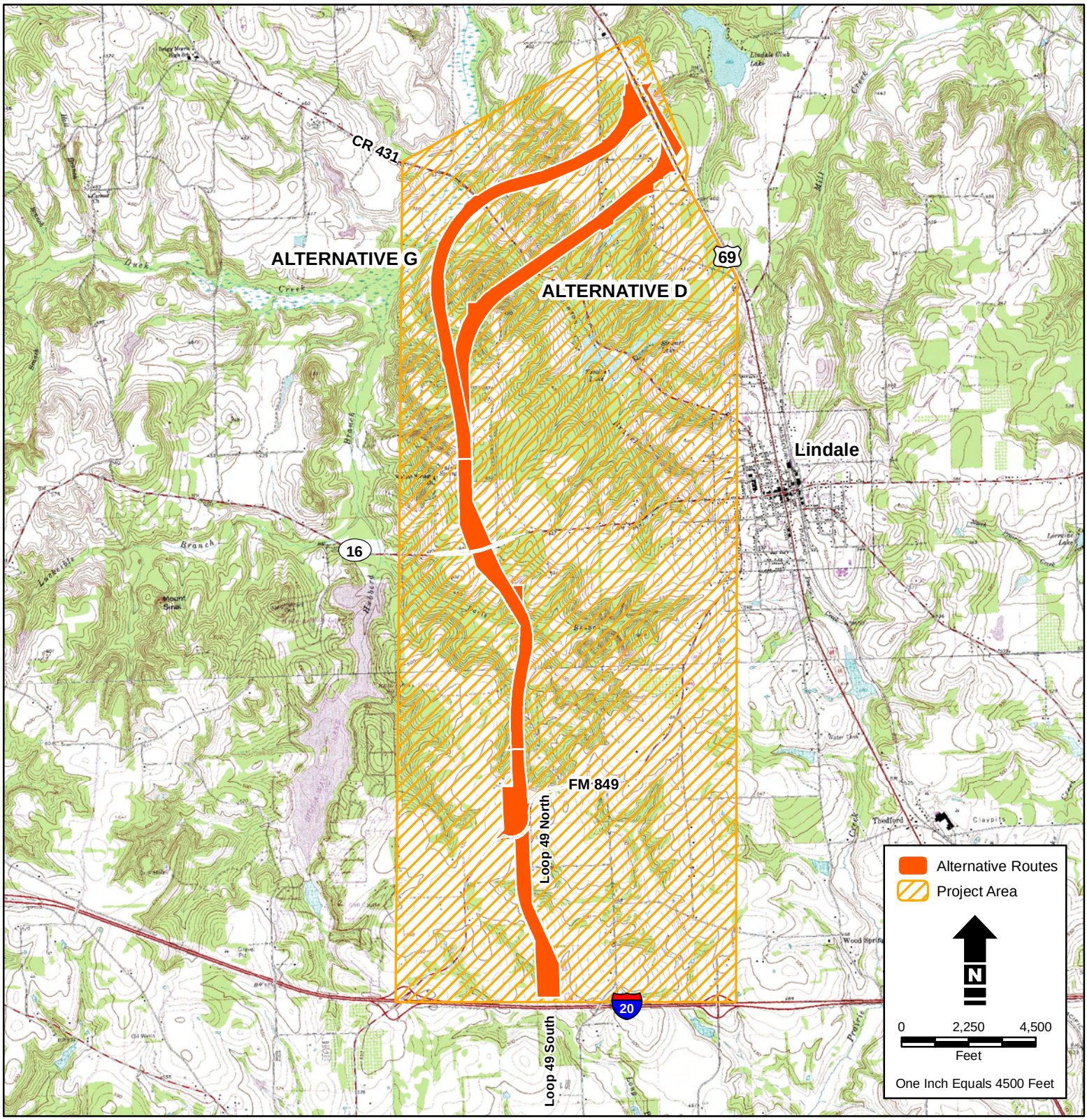
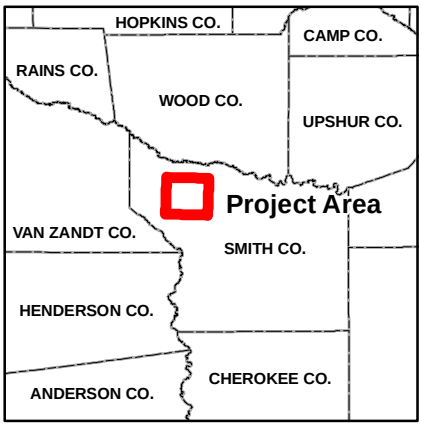


Figure ES-1

Project Location

CSJ: 0190-04-033



Following development of a Draft Environmental Assessment (EA), it was determined, primarily due to local controversy, that the appropriate level of analysis under NEPA was as an Environmental Impact Statement (EIS) and that the project would be considered as a potential candidate for tolling. The decision to prepare an EIS, as opposed to finalizing the EA, was driven by the amount of potential impacts and local controversy surrounding alignment selection. The city of Hideaway, to the west of the corridor, presented organized opposition to western alignment alternatives, while various residents of the city of Lindale and youth camps on the west side of Lindale were concerned about eastern alignment alternatives.

A Notice of Intent (NOI) to develop an EIS for the proposed project was published in the Texas Register on August 11, 2006, and in the Federal Register on August 18, 2006. On April 3, 2007, the project Need and Purpose and project Coordination Plan were approved by FHWA, in accordance with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) Section 6002 requirements (TxDOT, 2007a). The SAFETEA-LU environmental review process for projects requiring preparation of an EIS and the steps taken during the planning process for this project are summarized in **Table ES-1**.

Table ES-1 SAFETEA-LU Environmental Review Process

SAFETEA-LU Requirement	How Addressed for Lindale Reliever Route
1. Publication of NOI	NOI to prepare an EIS for the Lindale Reliever Route was published in Federal Register on August 18, 2006, and in the Texas Register on August 11, 2006.
2. Notification of lead Federal agency at U.S. Department of Transportation	TxDOT notified the appropriate FHWA representative.
3. Invitation to participating and coordinating agencies – letters of invitation must be mailed out soliciting comments on the Draft Need and Purpose and providing them with the draft Coordination Plan and project schedule. If the project schedule is later modified, the modified schedule must be provided to all agencies. The agencies are allowed 30 days to provide comments.	Letters including the draft Need and Purpose, draft Coordination Plan, and project schedule were sent to the following agencies: Smith County, Tyler Metropolitan Planning Organization (MPO), City of Lindale, City of Hideaway, Smith County Historical Commission Chair, Texas General Land Office, USDA-Natural Resources Conservation Service, Texas Railroad Commission, Texas Commission on Environmental Quality, Environmental Protection Agency, U.S. Army Corps of Engineers, Tribal Coordination, State Historical Preservation Office, Texas Historical Commission, Texas Parks and Wildlife Department, U.S. Fish and Wildlife Department, Sabine River Authority, East Texas Council of Governments, and Northeast Texas Regional Mobility Authority. A Scoping Meeting was held on September 25, 2006, to present the Need and Purpose, draft Coordination Plan, and project schedule.
4. Provide public involvement opportunity to solicit comments on project Need and Purpose and to provide the project schedule. If the project schedule is later modified, the modified schedule must be shared with the public. The public comment period is not to exceed 30 days.	A Scoping Meeting was held on September 25, 2006 to discuss the Need and Purpose, draft Coordination Plan, and project schedule. After FHWA approval of the project Need and Purpose (on April 3, 2007), a Scoping Meeting and a Participating Agency Meeting were held on May 22, 2007 to present it to agencies and the public.
5. Identification of range of alternatives, including the solicitation of comments from agencies and the public on project alternatives. The comment periods for both agencies and the public, is not to exceed 30 days.	A Participating Agency Meeting, which included the public, was held on November 16, 2006 to present the proposed study corridors and corridor evaluation criteria. On November 27, 2007, a Scoping Meeting and Participating Agency Meeting were held to present the project alternatives (Alternatives D and G) to agencies and the public.

Table ES-1 SAFETEA-LU Environmental Review Process (continued)	
SAFETEA-LU Requirement	**How Addressed for Lindale Reliever Route**
6. Collaboration on impact assessment methodologies	TxDOT has taken under consideration input from agencies regarding impact assessment methodologies.
7. Completion of DEIS and publication of notice in the Federal Register. The comment period for agencies and the public is not to exceed 60 days	The DEIS (current document) is currently underway.
8. Identification of the preferred alternative and the level of design	Alternative G has been identified as the technically preferred alternative and the level of design has been determined.
9. Completion of the Final EIS	To be completed in a subsequent step.
10. Completion of Record of Decision (ROD)	To be completed in a subsequent step.
11. Completion of permits, licenses, or approvals, after the ROD	To be completed in a subsequent step.

Several public meetings have taken place to inform interested citizens about the proposed project and to solicit their input. Along with recommendations of various federal, state, and local agencies (see #3 in **Table ES-1**), the input and concerns of the public have played a substantial role in the development of routes and the identification of the technically preferred alternative.

A brief listing of public involvement opportunities and project milestones follows:

- 1999 to 2001 – Project Feasibility Study period: initial routes and constraints were evaluated;
- February 7, 2000 and April 13, 2000 – Steering Committee Meetings: presented project and study corridor to local community leaders, potentially affected property owners, and homeowners associations;
- November 18, 2004 – Open House Public Meeting: presented potential tolling aspect – project met with opposition from some nearby residents but was supported by local and regional elected officials and business leaders;
- January 5, 2005 – Steering Committee Meeting: presented corridor alternatives;
- June 28, 2005 – Second Public Meeting: project and preliminary alignments presented – 530 people attended and opposition peaked; particularly to westernmost alignment by City of Hideaway and easternmost alignment by Timberline Baptist Camps;
- Fall 2005 – Project elevated to EIS;
- August 11 and 18, 2006 – Notices of Intent to prepare EIS published in Texas and Federal Registers, respectively;
- September 25, 2006 – First Scoping Public Meeting: Need and Purpose, draft Project Coordination Plan and project schedule presented; 115 people attended (86 members of public) and 15 comments and a petition with 266 signatures of city of Hideaway residents opposing westernmost alternative;
- November 16, 2006 – First Participating Agency/Affected Property Owner Public Meeting and Workshop: study corridors, corridor evaluation criteria, draft Need and Purpose and Coordination Plan presented/discussed with affected property owners,

participating agencies and members of the public (attended by 19 people – 12 agency personnel and seven members of the public); Corridor Evaluation and Criteria & Relative Importance Factor Survey provided to list and rank project concerns with a 30-day submission deadline; resulting ranking (highest to lowest) was: Social Impacts, Project Safety and Access, Project Cost and Engineering, and Natural Environment;

- May 22, 2007 – Second Public Scoping Meeting and Participating Agency Meeting: held to present the FHWA-approved need and purpose, Coordination Plan, project corridors, evaluation criteria, and evaluation data to property owners, participating agencies, and the public; 112 people attended and most comments expressed preference for western alignments or No Build Alternative;
- November 27, 2007 – Participating Agency/Affected Property Owner Public Meeting and Project Alternatives Public Meeting: held to present Alternatives D and G to the participating agencies, affected property owners and general public; 63 property owners, 14 agency personnel, and one member of the press attended; Comments were largely in favor of the proposed project, and the majority of the comments expressed support for Alternative G; and
- June 10, 2008 – Participating Agency/Affected Property Owner Public Meeting: held to present locally preferred alternative (Alternative G); 88 members of the public, three public officials and 22 TxDOT representatives attended; comments were generally in favor of the project and locally preferred alternative; some concerns expressed regarding access to adjacent properties and tolling

Remaining federal actions for this project include:

- FHWA approval of the Draft and Final EIS documents;
- FHWA completion of the Record of Decision (ROD); and if applicable,
- Acquisition of permits such as U.S. Army Corps of Engineers Individual Permit for jurisdictional waters of the U.S. (including wetlands) impacts and coordination with the Texas Commission on Environmental Quality (TCEQ) regarding erosion and sedimentation controls.

Alternatives Analysis

NEPA requires that equivalent comparisons of environmental impacts among a set of reasonable alternatives be conducted before reaching a final decision on a major federal action (40 CFR 1502.14). As part of the project development process, FHWA and TxDOT provided cooperating and participating agencies and the public with opportunities to be involved in the development of the range of alternatives to be considered for the proposed project. This extensive process, described chronologically below, was implemented for the purposes of identifying a set of reasonable alternatives to be evaluated in greater detail in the DEIS (see **Chapter II**).

Feasibility Study

A feasibility study was conducted in 2001 to evaluate a reliever route for US 69 through the city of Lindale and is included in **Appendix F** (TxDOT, 2001b.). The study area evaluated for the feasibility study was an approximate five-mile by five-mile area north of IH 20, roughly centered on the existing US 69 route. The major factor considered in the study was improvement of north-south mobility along US 69 from IH 20 to north of the city of Lindale. There was a desire to relieve local congestion by providing enhanced through traffic conditions but widening alternatives through the city of Lindale were not considered feasible alternatives due to existing development along the route.

A Steering Committee consisting of various elected officials, business interests, and citizens of Lindale was organized during the feasibility stage of the project to assist TxDOT in assessing community issues related to the various options. Two Steering Committee meetings were held in Lindale; the first was held February 7, 2000, and the second was held April 13, 2000.

Members of the public were invited and many attended these meetings, and provided substantial input to the Steering Committee. The Steering Committee evaluated two main categories of route options: one to the east of the city of Lindale and one to the west. A western route was deemed more appropriate than an eastern path based on several factors, including the future construction of Loop 49 West and traffic-generating residential communities and businesses to the west of Lindale, which would benefit from construction of a reliever route. The eastern route was determined to be less suitable for a variety of land use, environmental, and community impact reasons, including higher impacts to waters of the U.S., including wetlands. Moreover, an eastern route would tend to divide the partially developed Lindale suburban community to a greater degree when compared to the other corridors. Following comments received at the first Steering Committee meeting, it was determined that the eastern route was not a feasible and reasonable alternative and would not be carried forward for further consideration.

Initial constraints or planning considerations identified for the western route alternatives included the future northern terminus of Loop 49 West, the city of Hideaway, Target Distribution Center, Prairie Creek and associated waterways, Timberline Baptist Encampment, Faulkner Park, and the Hubbard and Stevenson Branches of Duck Creek.

A number of environmental considerations were evaluated with regard to the construction of the US 69 Reliever Route around Lindale. Pertinent resource categories related to the human and natural environment were investigated in order to evaluate the magnitude of potential environmental constraints associated with the various route alternatives. Resource categories evaluated include:

- Social and economic impacts;

- Land use impacts;
- Water resources including wetlands and waters of the U.S.;
- Hazardous materials;
- Air quality impacts;
- Traffic noise impacts;
- Ecological resources including vegetation, wildlife, and threatened and endangered species; and
- Cultural Resources.

The feasibility study addressed regulatory compliance requirements, permitting, and potential mitigation issues for each of the resource categories evaluated. Traffic analysis conducted for the proposed reliever route feasibility study indicated that construction of the proposed roadway would reduce accidents and congestion for through traffic. These findings were fully documented in the feasibility study.

Based on input from the second Steering Committee meeting and the engineering and environmental considerations evaluated in the feasibility study, four 1,000-foot wide corridors were selected for evaluation as western alternative routes. In 2004 an additional corridor alternative, Route E, was added further to the west. Closest to the city of Hideaway, Route E was added for the purpose of avoiding development that had occurred since the initiation of the feasibility study. These corridors (A-B) were augmented with two connecting links to become seven corridor alternatives. The seven preliminary corridors were referred to as A, B, C, D, E, F and G.

Corridor Study Report

A corridor study report was completed July 27, 2007 (after the NOI was published), to evaluate the seven corridor alternatives that resulted from the feasibility study as well as to develop a reasonable number of alignment alternatives within the study corridors (see **Appendix F**). Engineering criteria and potential environmental impacts of each of the corridors were studied in the report. The 2007 corridor study determined that two corridors, Alternatives D and G, were feasible and reasonable and should be brought forward for further study. These reasonable alternatives, along with the No Build Alternative, are evaluated in this DEIS. The primary deciding factors, in addition to cost and cultural and natural resource considerations were that the westernmost corridors (E and F) were very close to the city of Hideaway and raised substantial community impact and public controversy issues. The easternmost corridors (A, B and C) were closest to the city of Lindale and also met with opposition. Alternatives E and F also raised constructability and safety concerns in that they traversed a landfill. These findings are fully documented in the corridor study report.

Identification of Reasonable Alternatives for Study in the DEIS

As a result of this decade-long process involving engineering and environmental studies and continuous participation by stakeholders and the public, three reasonable alternatives, Alternative D, Alternative G and the No Build Alternative, were advanced and are analyzed in this DEIS. Alternatives D and G have identical design and tolling criteria but traverse different routes and terminate at US 69 north of Lindale, approximately one-half mile apart. Alternatives D and G also have similar right-of-way widths, based upon the design requirements of each alternative.

Alternative D

Moving from south to north, Alternative D begins at the intersection of Loop 49 West and IH 20 and extends north, crossing FM 849 immediately west of the intersection of FM 849 and CR 472. It continues north, crossing FM 16 West at a point approximately 0.30 mile east of the intersection of FM 16 and CR 476. It then continues north and northwest, crossing CR 431 at a point approximately 0.33 mile northwest of the intersection of CR 431 and CR 4118. From this point, the alternative extends northeast, crossing CR 4118 at a point approximately 0.39 mile south of the intersection of CR 4118 and CR 4116 and continuing northeast to connect to US 69 at a point approximately 0.26 mile north of the intersection of US 69 and CR 4117.

Alternative D is approximately 7.0 miles long, and would require approximately 423.15 acres of right-of-way. Originally, the estimated construction cost for Alternative D was $94.3 million, adjusted to $71.6 million following the 2008 Value Engineering study (see **Sections II.C.4** and **II.D.1**). The current 2013–2016 Statewide Transportation Improvement Program (STIP) lists the estimated construction cost for the project as $63.0 million for the interim two-lane facility.

Construction of Alternative D would impact three county roads at the north project limit, requiring the realignment of CR 4148, the partial closure of CR 4116, and the extension of CR 4117 at US 69. Access to existing residences and businesses would be maintained with all these county road modifications. Near the south project limit, CR 473 would be realigned for both alternatives with a partial closure across the proposed US 69/Loop 49. The costs for these county road modifications are built into the construction costs cited above.

Alternative G

Alternative G shares the same southern terminus as Alternative D and follows the same route to the crossing of FM 16 West, at which point the two alternatives diverge. From FM 16 West, Alternative G continues north, northwest, and northeast, crossing CR 431 at a point approximately 0.87 mile northwest of the intersection of CR 431 and CR 4118. From this point,

the alternative extends northeast, crossing CR 4118 at a point approximately 0.06 mile (320 feet) north, of the intersection of CR 4118 and CR 4116 and continuing northeast to connect to US 69 at a point approximately 0.49 mile south of the intersection of US 69 and CR 4118.

Alternative G is approximately 7.4 miles long and would require approximately 427.5 acres of right-of-way. Originally, the estimated construction cost for Alternative G was $98.5 million, adjusted to $72.7 million following the 2008 Value Engineering study (see **Sections II.C.4** and **II.D.2**). The current 2013–2016 STIP lists the estimated construction cost for the project as $63.0 million for the interim two-lane facility.

Construction of Alternative G would not require the realignment, closure, or extension of any county roads at the north project limit.

Identification of Technically Preferred Alternative in DEIS: Alternative G

Both Alternatives D and G were found to meet the project's need and purpose. Based upon engineering studies, agency/public involvement carried out as part of the planning process, and the environmental impact assessment in the DEIS, Alternative G was identified as the technically preferred alternative.

Affected Environment

Baseline information was compiled for the project area to provide a detailed description of the environmental resources which could be affected by the proposed roadway alternatives. This information is provided in **Chapter III.** For the purposes of this DEIS, the project area is considered to be the area bounded on the north by Duck Creek's crossing at US 69, on the south by IH 20, on the east by the city of Lindale and on the west by the city of Hideaway. The environment is described in the DEIS by resource categories which include land use, socioeconomics, noise, geology and soils, climate and air quality, water resources, ecological resources, historical and archeological resources, and hazardous materials.

Environmental Consequences

A number of potential impacts or effects related to the construction and operation of the proposed Lindale Reliever Route reasonable alternatives, including the No Build Alternative, were identified, along with mitigation recommendations where applicable. Potential direct impacts of the proposed project are described in detail in **Chapter IV;** indirect and cumulative impacts are described in **Chapters V** and **VI,** respectively. These potential impacts are discussed below and summarized in **Table ES-2**.

Land Use Impacts

The proposed Lindale Reliever Route project alternatives would result in the conversion of approximately 423.15 to 427.50 acres of existing land uses to transportation use, depending on which build alternative is selected. Alternative D would impact 423.15 acres and Alternative G would require approximately 427.5 acres of new right-of-way. Each of the build alternatives would primarily affect agricultural/undeveloped land. The roadway design includes access roads only around the US 69, FM 16, and FM 849 intersections. The sections without access roads would not support future commercial development due to lack of direct access.

Parks, Public Lands and Facilities, including Section 4(f) Impacts

The proposed roadway alternatives would not affect any existing parklands, wildlife refuges, other public lands, or any National Register of Historic Places (NRHP) eligible structures.

Social/Community Effects

The proposed Lindale Reliever Route alternatives could affect existing travel patterns, vehicle access, and travel times for residents of the area. The preferred alternative would improve north-south access in western Smith County and relieve current and future traffic congestion on US 69. While the project may induce a small amount of growth, the main impact to the community of Lindale would be a decrease in through-traffic and large trucks through the center of town, increasing the attractiveness of downtown for shopping, restaurants, and other resident-oriented development. The City of Lindale leadership has expressed a desire to preserve a small-town, main-street feel along existing US 69 both in their comprehensive planning documents and in workshops associated with the project. The potential community effects of a tolled facility are being analyzed at two levels. A project-level toll analysis of the proposed roadway is provided at **Section IV.B.3.e**. A Project Level Toll Analysis is included in Regional Toll Analysis will be completed by TxDOT and the Tyler Area MPO and included in the Final EIS to evaluate potential tolling effects on low income and minority communities.

Relocations

Alternatives D and G would require 18 and 10 residential relocations, respectively (see **Residential and Commercial Displacements Plates 1–7** in **Appendix A**). The State's Relocation Assistance Program would be available to all residences displaced as a result of construction of the proposed project. The proposed project would result in six commercial displacements for Alternative D and one commercial displacement for Alternatives G. The acquisition and relocation program would be conducted in accordance with the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (P.L. 91-

646). Relocation resources would be made available to all residential relocations and business displacements without discrimination, consistent with the requirements of the Civil Rights Act of 1964 and Housing and Urban Development Act of 1974. Both residential and commercial relocations may be more difficult to accomplish and take more time for Alternative D than Alternative G, as lower cost homes are less available on the market and due to the number of businesses affected and the fairly specialized nature of their products and services. Business relocations may be facilitated by the recent development of a small industrial/commercial park along US 69 near the northern project limit.

Public Safety Effects

Area public safety would be improved by the new roadway. The proposed reliever route is expected to divert a substantial portion of the truck traffic from the existing US 69 roadway and other arterials, collectors and local roads, thus reducing the potential for traffic accidents.

Economic Effects

The proposed project would have a short-term or temporary positive impact on the local construction sector. Increased mobility over the long term may encourage businesses to move to the area. Commercial property values may increase.

Agricultural Effects

The new roadway would convert agricultural or undeveloped land to transportation use. Between 357.68 acres (Alternative D) and 377.15 acres (Alternative G) of land potentially used for agricultural purposes would be impacted, depending upon the alternative. This land is a mixture of forests, woods, and grasslands (pastures). The majority of the agricultural land supports livestock production, hay, and timber as opposed to row crops or orchards. Roadway construction also has the potential to segment some existing pastures; however, in most cases, allowances would be made for access to both sides.

Effects on Mineral Resources

Two non-energy mineral resource facilities (e.g., sand and gravel facilities) in the project area would be affected by the highway construction.

Air Quality Effects

The proposed project is located in an area that is in attainment for all Nation Ambient Air Quality Standards (NAAQS). Under both Build Alternatives, the proposed project would likely

result in localized increases in mobile source air toxics (MSATs) concentrations along the new roadway sections adjacent to the existing residential communities that front that area. MSATs would be lower in other locations as traffic shifts away from its existing location and toward the new roadway. However, under the Build Alternatives in the design year, it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to the reduced vehicle miles traveled (VMT) associated with more direct routing and the Environmental Protection Agency's (EPA's) MSAT reduction programs.

Noise Effects

The proposed project would result in traffic noise impacts at two receivers for Alternative D. As described in **Section IV.C.2** and shown on **Potential Environmental Constraints Plate 1** in **Appendix A**, Receiver R09 represents two residences located south of Alternative D southwest of CR 4116 at CR 4117. Receiver R10 represents three residences north of Alternative D to the north of CR 4118. Noise abatement for the sites which would be impacted under Alternative D is neither feasible nor reasonable, and therefore, no noise abatement is proposed for this alternative.

Alternative G would not result in a traffic noise impact.

Water Quality Impacts

Surface water resources in the project area could be affected by erosion/sedimentation associated with construction-related activities. The use of appropriate control strategies such as silt fences, diversion dikes, rock berms, sediment and containment basins, and re-vegetation during construction should reduce pollutant runoff to acceptable levels. After completion of construction, potential pollution of water resources is expected to be limited to the unlikely occurrence of catastrophic spill events associated with vehicle accidents. No substantial impacts to groundwater quality are anticipated as a result of the proposed improvements.

Impacts to Ecological Resources

The construction of either of the build alternatives would impact vegetation, aquatic systems, and wildlife communities. Impacts to the landscape would be reduced wherever possible through the maintenance of vegetation within the proposed right-of-way where feasible. Between 357.68 acres (Alternative D) and 377.15 acres (Alternative G) of undeveloped/agricultural land would be impacted, depending on the alternative selected; none of the impacted vegetation types are considered locally rare or unique. Either seven (Alternative D) or eight (Alternative G) crossings of waters of the U.S. would be required, depending on the alternative selected. The study area for the proposed project does not contain habitat for any federally listed threatened, endangered,

or candidate species. Neither of the build alternatives would directly nor indirectly impact federally listed species; however, some potential habitat for nine state-listed species may be impacted.

Floodplain Impacts

None of the build alternatives considered for the project would avoid floodplain impacts (see **Table 7** for comparison); both Alternative D and Alternative G cross the 100-year floodplain at two locations. Neither of the proposed build alternative crossings represents a significant 100-year floodplain encroachment, as that term is defined in FHWA's floodplain regulations (23 CFR 650.113). The proposed action conforms to applicable state and local floodplain protection standards. Further detail is provided in **Section IV.F.2.b**. Measures to minimize floodplain encroachment effects associated with the chosen alternative would be developed during later phases of project design, in accordance with Executive Order 11988. The project would not increase the base flood elevation above Federal Emergency Management Agency (FEMA) regulations.

Cultural Resource Effects

A total of seven known archeological sites would be impacted by Alternative D (four of which could be potentially eligible for National Register of Historic Places [NRHP] or State Archeological Landmark [SAL] listing), while a total of 6 known sites would be impacted by Alternative G (one of which could be potentially eligible for NRHP or SAL listing). Two of the potentially eligible archeological sites (Sites 41SM388 and 41SM393) and a potential platform mound were investigated in the Summer of 2011. Site 41SM388 is located along both Alternatives D and G, while Site 41SM393 and the potential platform mound are located along Alternative D only. The archeological survey report containing recommendations based on the investigations to the THC and TxDOT in October 2012 and is awaiting agency responses (Hicks & Company, 2012). If TxDOT and the THC agree with the survey recommendations that these sites are not eligible for listing on the NRHP or as SALs, coordination will be complete for these sites. It is also stated in the October 2012 report that the landform was determined not to be a platform mound as initially interpreted.

Two other sites (Sites 41SM394 and 41SM395) on Alternative D have not been investigated due to denied access. These sites cannot be investigated unless TxDOT obtains right-of-entry or acquires the right-of-way in which these sites are located. If the survey report recommendations are confirmed by TxDOT and the THC, Alternative D would impact seven known sites, three of which would still be considered potentially eligible; Alternative G would impact six known sites, none of which would still be considered potentially eligible.

In addition, there are still portions of right-of-way on Alternatives D and G that may include additional sites that have not been surveyed due to denied access. These areas cannot be surveyed unless TxDOT obtains right-of-entry or acquires the right-of-way in these locations.

Effects on Hazardous Materials Sites

Searches of hazardous material databases revealed no hazardous materials sites within the alternative alignment corridors; however, field investigations identified two hazardous material sites in the project area. Both of these sites would be impacted by construction of Alternative D but would not be impacted by Alternative G. These sites would likely be avoided; however, any hazardous waste encountered during construction would be handled according to applicable federal, state, and local regulations through TxDOT Standard Specifications.

Visual Resource Effects

The introduction of a highway into the project area impacts the visual landscape. In addition to using strategic depressed sections in the design, the maintenance of native vegetation within the right-of-way, where feasible, would reduce the visual effect of the roadway and make it more compatible with the surrounding area.

Energy Effects

Both Build Alternatives would have little effect on the development, transportation, or conservation of energy resources.

Construction Effects

Construction effects would be of relatively short duration. These effects include the generation of dust, erosion and sedimentation, increased noise levels and air pollutants, and temporary interference with normal traffic patterns.

Indirect Effects

The Council on Environmental Quality (CEQ) defines indirect effects as those that are "caused by an action and occur later in time or farther removed in distance, but are still reasonably foreseeable." The method used to evaluate the indirect effects of the proposed project is based on the seven-step method prescribed by TxDOT (2010), the National Cooperative Highway Research Program in Report 466 (NCHRP 2002) and Project 25-25 Task 22 (NCHRP 2007).

An evaluation of the project's indirect effects results in the identification of notable features (water resources, agricultural and timber land, and a minority community). Analysis of induced growth effects and encroachment-alteration effects concluded that substantial indirect effects are not anticipated to the notable features within the project area. It was concluded that, while some induced growth is anticipated, indirect effects resulting from the proposed project would be minimal.

Cumulative Effects

Cumulative effects on the environment are those "which result from the environmental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but cumulatively significant actions taking place over a period of time." The cumulative effects analysis in this EIS follows the eight-step method recommended by TxDOT (2010).

Resources brought forward for cumulative effects analysis include land, water resources, vegetation and wildlife, and archeological resources. None of these resources would be substantially affected by cumulative impacts resulting from the proposed project.

Recommendations for Mitigation

It is anticipated that compensatory mitigation for impacts to wetlands would be accomplished using the Anderson Tract maintained by the Texas Parks and Wildlife Department (TPWD). No mitigation for impacts to project area vegetation is proposed because impacted vegetation is not considered locally rare or unique. Hydraulic studies and resulting structures would minimize roadway impacts to floodplains crossed by the proposed project. Construction phase mitigation efforts include the implementation of Best Management Practices (BMPs) to maintain water quality, watering the construction site to control fugitive dust, limiting disturbance to native vegetation and prompt re-vegetation, and implementation of erosion and sediment controls.

Regarding cultural resources, recommendations concerning mitigation of adverse effects are forthcoming, pending THC and TxDOT response to the results of the eligibility testing of Sites 41SM388 and 41SM393. Recommendations regarding the eligibility of Sites 41SM393 and 41SM394 would be made subsequent to further investigation.

Mitigation options for potential direct project impacts are identified in **Chapters IV** and **VII.**

Summary of Environmental Consequences

The direct effects of the proposed US 69 Lindale Reliever Route project are summarized in **Table ES-2.**

Table ES-2 Summary of Environmental Consequences

Resource Impacted	Quantity/Nature of Impact		
	No Build	**Alternative D**	**Alternative G**
Land	No direct impacts, though if the Reliever Route is not constructed, existing roadways would need to be made to alleviate congestion	Conversion of 423.15 acres of existing land uses to transportation use	Conversion of to 427.5 acres of existing land uses to transportation use
Community Quality of Life	No acquisition of property or displacements, though congestion conditions would continue to deteriorate, and required future improvements to US 69 would be costly in terms of dollars and traffic disruptions	Relocation of 18 residences and 6 businesses; removal of property from local tax rolls; temporary localized effects (detours, traffic delays) on community quality of life during construction; potential environmental justice concerns	Relocation of 10 residences and 1 business; removal of property from local tax rolls; temporary localized effects (detours, traffic delays) on community quality of life during construction; potential environmental justice concerns
Water Resources, Including Waters of the U.S. and Wetlands	No impacts to surface water quality, floodplains, groundwater, waters of the U.S. or wetlands	7 crossings of waters of the U.S. including 4 wetlands affected; 6.17 acres of floodplains occur within the proposed right-of-way; potential changes in hydrology, flow characteristics; increased TSS in storm water runoff (construction phase)	8 crossings of waters of the U.S. including 5 wetlands affected; 23.64 acres of floodplains occur within the proposed right-of-way; potential changes in hydrology, flow characteristics; increased TSS in storm water runoff (construction phase)
Vegetation	No impacts to vegetation resources	373.17 acres of vegetation removed, including 206.85 acres of forest vegetation	394.55 acres of vegetation removed, including 196.63 acres of forest vegetation
Wildlife	No impacts to wildlife resources	Habitat loss or alteration; displacement of wildlife	
Threatened or Endangered Species (T&E)	No effects/impacts to any federally or state-listed threatened or endangered species	No T&E species or habitat for federally-listed species directly affected. Some potential habitat for state-listed species impacted.	
Soils/Farmland	No impacts to prime farmland soils	Conversion of 13.18 acres of prime farmland soils to transportation use; soil compaction in some areas within right-of-way	Conversion of 12.18 acres of prime farmland soils to transportation use; soil compaction in some areas within right-of-way

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Table ES-2 Summary of Environmental Consequences (continued)			
Resource Impacted	**Quantity/Nature of Impact**		
	No Build	**Alternative D**	**Alternative G**
Hazardous Materials	No impact to hazardous materials sites	Potential impacts to 2 hazardous materials sites; use of potential contaminants (fuel, solvents) and generation of solid waste during construction; roadway pollutants in runoff during operation	No impact to any known potential hazardous materials sites; use of potential contaminants (fuel, solvents) and generation of solid waste during construction; roadway pollutants in runoff during operation
Noise	Gradually increasing noise along the existing US 69	2 noise impacts, as defined by FHWA, from roadway operation; temporary construction phase noise effects	No noise impacts, as defined by FHWA, from roadway operation; temporary construction phase noise effects
Air Quality	Gradually increasing MSAT emissions as traffic volumes increase and traffic congestion continues to worsen within the existing roadway	Area expected to remain in attainment under NAAQS standards; MSAT emissions for all alternatives expected to remain the same or decrease due to EPA's National Control programs; potential fugitive dust from construction activities	
Historic Resources	No impacts to historic resources are anticipated		
Archeological Resources	No impacts to archeological sites	Impact 7 known archeological sites; 4 potentially NRHP/SAL-eligible sites*	Impact 6 known archeological sites; 1 potentially NRHP/SAL-eligible*

2 *Pending TxDOT and THC concurrence. If report recommendations are confirmed, Alternative D would impact 7 known
3 archeological sites, 3 of which are considered potentially NRHP/SAL-eligible, while Alternative G would impact 6 known
4 archeological sites, none of which are considered potentially NRHP/SAL-eligible.
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I. Introduction

I.A. Description of the Proposed Action

The Texas Department of Transportation (TxDOT), in conjunction with the Federal Highway Administration (FHWA), proposes to construct the U.S. Highway (US) 69/Loop 49 North Lindale Reliever Route roadway facility in Smith County, Texas (CSJ 0190-04-033). The improvement would involve construction of Loop 49 North (also referred to as the proposed Lindale Reliever Route), a new location, four-lane divided section in a usual minimum of 450 feet of right-of-way with limits from the Loop 49 West/Interstate Highway (IH) 20 Interchange to US 69 north of the city of Lindale. The project would be built in phases: the interim phase would be a two-lane section, and the ultimate build-out scenario would be a four-lane divided section. The project would be approximately 7.0 or 7.4 miles in length, depending on the alignment alternative selected. This project would serve as a connector/continuation between the recently completed Loop 49 West and US 69 north of Lindale. The limits from the IH 20 interchange to US 69 represent logical termini, and the project would have independent utility (regardless of a potential future integration with plans for Loop 49 [see **Section I.D.1.**]). The project will be funded with toll revenue bonds. The North East Texas Regional Mobility Authority has committed to issue these bonds and construct the Lindale Reliever Route as their next expansion of the toll system.

This Draft Environmental Impact Statement (DEIS) is intended to provide a detailed description of the project planning process for the proposed Lindale Reliever Route, resulting in the identification of a technically preferred alternative. A detailed discussion of the alternatives analyzed for this proposed roadway is presented in **Chapter II**. Potential impacts associated with each of the reasonable alternatives studied are discussed for each resource category in **Chapter IV**. A description of the technically preferred alternative identified as a result of the planning process associated with this DEIS is presented in **Section II.E.2**.

This project has been developed in accordance with the procedural provisions of the National Environmental Policy Act (NEPA); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Part 1500); Environmental Impact and Related Procedures (23 CFR Part 771); FHWA Technical Advisory T6640.8A; Environmental Review and Public Involvement for Transportation Projects (Texas Administrative Code [TAC] Title 43 Part I Chapter 2 Subchapter A); and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (23 United States Code [U.S.C.] 139). This DEIS discusses the need and purpose for the proposed roadway, alternatives considered, anticipated impacts to human and natural resources resulting from the implementation of various alternatives, and a summary of public and agency involvement in the DEIS process.

I.B. Need for and Purpose of the Proposed Action

I.B.1. Need for the Proposed Action

The proposed improvements are designed to provide a safe and efficient transportation corridor. TxDOT has identified the following underlying needs that the project would address: (1) safety, (2) system linkage, and (3) capacity. The purpose of the project is to improve safety, increase regional mobility, and provide capacity to relieve traffic demands and volumes along the existing US 69 roadway through Lindale. Construction of the Lindale Reliever Route would provide additional capacity and allow an alternative, higher speed route for use by through traffic, alleviating current safety issues. The Lindale Reliever Route is part of the Loop 49 regional transportation network around the city of Tyler.

I.B.1.a. Safety and Traffic Volume Evaluation

During the decade 2000 to 2010, a considerable amount of development including retail development has occurred in the Tyler metropolitan area. Residential, industrial and commercial growth has also occurred in and around the city of Lindale. The cities of Tyler and Lindale expect the trend of increasing development to continue. Along with economic benefits, this development has brought increased traffic volumes to the existing US 69 system, with increased congestion occurring in downtown Lindale. Completion of the Loop 49 West facility without a US 69 Reliever Route in place would require rerouting Loop 49 West traffic east along IH 20 to US 69, then along the current roadway through Lindale, greatly increasing the traffic congestion and decreasing roadway safety on the existing facility.

An analysis of traffic crash data for 2010-2012 along existing US 69 through Lindale yields a crash rate of approximately 297 crashes per 100 million vehicle miles of travel. This value is greater than the current 2011 state average crash rate for an urban four-lane divided highway facility, 106.93 per 100 million vehicle miles of travel, as published by TxDOT. Contributing factors to the existing facility's higher than average crash rate include the presence of seven signalized intersections, 24 un-signalized intersections, a school speed zone, numerous driveways, and the presence of parallel parking along the route.

The proposed reliever facility would be designed as a rural four-lane divided facility; the current 2011 state average crash rate for that type of facility as published by TxDOT is 40.29 per 100 million vehicle miles of travel (substantially lower than existing conditions). Using TxDOT-generated design traffic data, and linearly interpolating for 2013, this lower crash rate would result in an expected 3.11 crashes per year, compared to an expected 22.94 crashes per year for the existing facility. This represents an 86-percent reduction in yearly crashes.

The volume of vehicular traffic throughout the project area was evaluated as a part of the Feasibility Study for the Lindale Reliever Route (TxDOT, 2001). The following **Table 1** shows the anticipated change in traffic along existing US 69 through Lindale using traffic data from the Feasibility Study, 2010 TxDOT traffic data, and adjusting the data for a Base Year of 2013 and a Design Year of 2033 by linear interpolation or extrapolation.

Table 1 Average Daily Traffic (ADT) on US 69, with and without Proposed Reliever Route

		From IH 20 to Eagle Spirit Dr	From Eagle Spirit Dr. to FM 16	From FM 16 north
US 69 without reliever route	2013 ADT	30,800 vpd	19,400 vpd	16,800 vpd
	2033 ADT	36,800 vpd	23,200 vpd	20,200 vpd
US 69 with reliever route	2013 ADT	26,900 vpd	15,500 vpd	14,800 vpd
	2033 ADT	30,100 vpd	16,500 vpd	16,800 vpd

Source: Traffic data taken from the Feasibility Study for Lindale Reliever Route and 2010 TxDOT Traffic Projections.
TxDOT traffic data linearly interpolated or extrapolated for Base Year and Design Year.
vpd = vehicles per day; ADT = Average Daily Traffic; Base Year ADT – 2013; Design Year/Future ADT – 2033

The traffic based on the Base Year 2013 for US 69 without the reliever route was estimated to be 30,800 vehicles per day (vpd) from IH 20 north to Eagle Spirit Drive. From Eagle Spirit Drive to FM 16 there was an estimated 19,400 vpd. From FM 16 north there was an estimated 16,800 vpd. These numbers increase for the future Average Daily Traffic (ADT) (2033). From IH 20 north to Eagle Spirit Drive the traffic is estimated to be 36,800 vpd. From Eagle Spirit Drive north to FM 16 it is estimated to 23,200 vpd. From FM 16 north it is estimated to be 20,200 vpd. This section of roadway is already congested. The existing roadway consists of four travel lanes with a continuous left-turn lane.

The traffic based on the Base Year 2013 and Design Year 2033 on US 69 with the reliever route is projected to decrease. From IH 20 to Eagle Spirit Drive there is an estimated 26,900 vpd. From Eagle Spirit Drive to FM 16, there was an estimated 15,500 vpd. From FM 16 north, the traffic was estimated to be 14,800 vpd. The future ADT for 2033 on US 69 with the reliever route is projected to be less than the existing traffic on US 69 without the reliever route. From IH 20 to Eagle Spirit Drive, traffic is projected to be 30,100 vpd. From Eagle Spirit Drive to FM 16, the traffic is projected to be 16,500 vpd. From FM 16 north the 2031 traffic is projected to be 16,800 vpd with the reliever route.

The volume of vehicular traffic on the project was also evaluated as a part of the Feasibility Study for the Lindale Reliever Route (TxDOT, 2001) in 2001. The following **Table 2** shows the anticipated traffic along existing US 69 through Lindale and on the Lindale Reliever Route using traffic data from the Feasibility Study and adjusting the data for a Base Year of 2013 and a Design Year of 2033 as well as using 2010 TxDOT traffic projections for the Lindale Reliever.

Table 2 Average Daily Traffic (ADT) on Proposed Reliever Route and on US 69 with Proposed Reliever Route							
		From IH 20 to Eagle Spirit Dr.	From Eagle Spirit Dr. to FM 16	From FM 16 north	From IH 20 to FM 849	From FM 849 to FM 16	From FM 16 to US 69 north of Lindale
US 69 with Reliever Route	2013 ADT	26,900 vpd	15,500 vpd	14,800 vpd	NA	NA	NA
	2033 ADT	30,100 vpd	16,500 vpd	16,800 vpd	NA	NA	NA
Lindale Reliever Route	2013 ADT	NA	NA	NA	3,900 vpd	3,900 vpd	2,000 vpd
	2033 ADT	NA	NA	NA	6,700 vpd	6,700 vpd	3,400 vpd

Source: Traffic Data taken from the Feasibility Study for Lindale Reliever Route and 2010 TxDOT Traffic Projections.
TxDOT traffic data linearly interpolated or extrapolated for Base Year and Design Year.
vpd = vehicles per day; ADT = Average Daily Traffic; Base Year ADT – 2013; Design Year/Future ADT – 2033

These traffic projections indicate that diversion to the proposed reliever route in Design Year 2033 will lessen projected traffic volume on US 69. From IH 20 to FM 849 the traffic was estimated to be 3,900 vpd in 2013. From FM 849 to FM 16, the 2013 traffic was estimated to be 3,900 vpd. From FM 16 to US 69 north of Lindale, the traffic was estimated to be 2,000 vpd. The future ADT for 2033 for the same area shows a slight increase of traffic. From IH 20 to FM 849 traffic was projected to be 6,700 vpd. From FM 849 to FM 16 traffic was projected to be 6,700 vpd. From FM 16 north to US 69 north of Lindale traffic was projected to be 3,400 vpd. This slight increase of vehicles on the reliever route would help alleviate the congestion on US 69 through the city of Lindale.

Although the existing US 69 facility meets current roadway design standards, the facility is considered inefficient based upon the following factors: limited capacity, low operating speeds, and safety concerns associated with mixing high speed through traffic with local low speed access and turning traffic. Construction of the Lindale Reliever Route would address these inefficiency and safety issues by providing an alternative route for use by future through traffic, thereby reducing future congestion on US 69 in Lindale. The roadway design includes access roads only around the US 69, FM 16, FM 849, and IH 20 intersections. There are no continuous access roads included in the design of the project; therefore, future commercial development would not be supported due to lack of direct access.

I.B.1.b. System Linkage

Improving the existing US 69 facility by adding lanes would not achieve the desired mobility due to the lack of access control and the numerous driveways and intersecting streets along the roadway. When reviewing overall system linkage with a reliever facility west of Lindale, using and incorporating the Loop 49 West facility tying to IH 20 west of Lindale was investigated in the feasibility study. For this project, tying to Loop 49 West allows for a US 69 relief route for

not only Lindale but also Tyler as well. During the feasibility planning phase of the project, the continuation of access control features and design to match Loop 49 south of Tyler was recommended in order to address driver expectancy and mobility needs.

A completed Loop 49 would provide an important link in the integrated regional transportation network, ultimately forming a loop around the city of Tyler (when combined with IH 20) while allowing through-traffic to bypass the existing and increasingly congested roadway network within Tyler, particularly US 69 (which crosses highly populated residential areas, school zones, and commercial areas). US 69 is a component of the Texas Trunk System and provides for the movement of people and freight goods in east and northeast Texas. By allowing through-traffic to bypass the city centers and providing alternate routes for travelers, mobility in the area would be increased. The project is included in the STIP as CSJ 0190-04-033 and the Tyler Area MPO's 2035 MTP as Loop 49, Segment 4 (Lindale Relief Route) (Tyler Area MPO, 2010).

I.B.1.c. Capacity

The proposed facility would be designed to provide adequate capacity to meet future traffic demands and volumes. US 69 from Lindale to Mineola is a high speed four-lane divided facility, Loop 49 West is a high speed toll road opened to toll traffic in March 2013. US 69 north of Lindale, IH 20 and Loop 49 West are facilities without traffic signals or low speed zones. In contrast, the existing US 69 through downtown Lindale includes an urban, undivided section with multiple signals and low speed zones, including one school speed zone.

The Lindale Reliever Route project is an important part of the City of Lindale's plan to revitalize the downtown area along US 69 and maintain the "Main Street" atmosphere of the area (City of Lindale, 2004). A Level of Service (LOS) analysis performed for the project as part of the 2001 feasibility study showed that the LOS for US 69 in Lindale would be improved if the Lindale Reliever Route is constructed. A brief description of each LOS is found in **Table 3**. Existing traffic conditions have an LOS of B to C for intersections along US 69 in Lindale, and LOS of A to B for the non-signalized stretch of US 69 south of Lindale between the city center area and IH 20. With the reliever route in place, LOS is predicted to be A to B for US 69 south of Lindale, and A at intersections in Lindale. Without construction of the reliever route, the predicted LOS for 2027 is B for the section south of Lindale, and D in Lindale. The finding of LOS D without construction of the project indicates that users of US 69 would experience high density, stable to approaching-unstable traffic flow conditions with operational problems and a poor level of comfort/convenience.

Table 3 Levels of Service (LOS)	
LOS	**Description**
A	Free flow conditions. Freedom to select desired speed is extremely high. Freedom to maneuver within the traffic stream is extremely high. General level of comfort/convenience for motorists is excellent.
B	Stable flow conditions. Presence of other vehicles in the traffic stream becomes noticeable. Slight decline in the freedom to maneuver within the traffic stream.
C	Stable flow conditions. Ability to maneuver and operating speed in the traffic stream is significantly affected by other vehicles. General level of comfort/convenience declines noticeably at this level.
D	High density, but stable flow – approaching unstable traffic flow. Speeds and freedom to maneuver are severely restricted. General level of comfort/convenience is poor. Small increases in traffic flow will generally cause operational problems at this level.
E	Unstable flow. Speeds reduced to a low, but relatively uniform value. Volumes at or near capacity level. Freedom to maneuver within the traffic stream is extremely difficult. Small increases in traffic flow or minor perturbations within the traffic stream will cause breakdowns.
F	Forced or breakdown flow conditions. Volumes exceed roadway capacity. Formation of unstable queues. Operations within the queue are characterized by stop-and-go conditions. Stoppages for long periods of time because of traffic congestion.

Source: Transportation Research Board, Highway Capacity Manual, Special Report #209, 1994.

US 69 in the vicinity of IH 20 currently operates at LOS D. The US 69/IH 20 interchange had a higher volume of traffic than any other interchange along IH 20 in east Texas. TxDOT traffic volume forecasts for this area indicate an "unacceptable LOS F in 2027" if the Reliever Route is not constructed and US 69 remains in its current four-lane configuration. Alternatively, US 69 would operate at a marginal LOS D in 2027 with the construction of the Reliever Route (City of Lindale, 2004).

The LOS Analysis conducted for the proposed Lindale Reliever Route as part of the Corridor Study Report (TxDOT, 2005) predicted an LOS A for the years 2007, 2027, and 2037 along all segments of the route studied (IH 20 to FM 849, FM 849 to FM 16, FM 16 to CR 431, CR 431 to US 69). Weaving analysis performed for the assumed conceptual interchanges at FM 849 and FM 16, using projected 2037 volumes, indicated an LOS A for the weaving sections (TxDOT, 2005).

I.B.2. Purpose of the Proposed Action

The purpose of the proposed action would serve these stated needs:

- Improved safety and reduced accident rates.

  The existing US 69 facility meets current roadway design standards; however, the facility is considered inefficient with respect to its low operating speeds, limited capacity and

safety concerns associated with mixing high speed through traffic with local low speed traffic and turning traffic. Construction of the Lindale Reliever route would address these inefficiency and safety issues by providing an alternative route for use by future traffic, thereby reducing future congestion on US 69 through Lindale.

- System linkage through construction of a highway that would facilitate the movement of people and goods throughout the region.

  The Lindale Reliever Route would complement the regional concepts for US 69 and Loop 49 around the city of Tyler. The southern and western sections of the Loop (Loop 49 south and West) are toll roads and the proposed Lindale Reliever Route facility would be an extension of Loop 49 continuing north and tying into existing US 69 north of Lindale (Loop 49 North). Loop 49 South and West have been completed. This northern Lindale component of Loop 49 provides an important link in the regional transportation system.

- Adequate capacity to meet future traffic demands and volumes.

  Traffic studies conducted on existing US 69 and the proposed project show an improved volume to capacity ratio on existing US 69 through Lindale if through traffic is diverted to the reliever route.

Construction of the Lindale Reliever Route would fulfill the needs to improve safety, improve mobility in the regional transportation system by linking Loop 49 to existing US 69 north of Lindale, and provide additional overall capacity for traffic moving through the Lindale area.

The project need and purpose provide general criteria for identifying and evaluating project alternatives and identifying the technically preferred alternative.

I.C. Regional Setting

1.C.1. Regional Environmental Conditions

The project is located within Smith County, Texas. Smith County encompasses approximately 607,616 acres in northeast Texas. Elevations range from approximately 270 feet above sea level in the northeastern part of the county to approximately 670 feet above sea level in the northwestern part of the county.

Smith County is located in a transitional area between the Pineywoods and the Post Oak Savannah vegetational regions of Texas historically mapped by Gould (1975), and is also within

the West Gulf Coastal Plains Ecoregion more recently mapped by Griffith et al. (2004) and EPA (2003) (see **Section III.G.1**). The portions of the county that have not been cleared for agriculture or urban uses are heavily forested by various tree species. The topography of the county ranges from nearly level to steeply sloped. The drainage pattern is well defined, and many streams dissect the county. The northern part of the county drains northeasterly into the Sabine River. The western and southwestern parts drain southwesterly into the Neches River and Lake Palestine, while the eastern and southeastern parts drain southeasterly into West Mud Creek, Mud Creek, and other major streams that flow into the Angelina River.

The soils of Smith County formed mostly under forest vegetation. The upland soils are light in color and dominantly sandy or loamy and are subject to erosion in unprotected sloping areas. The soils found on floodplains of major creeks, the Neches River, and the Sabine River are loamy or clayey.

Approximately 32 percent of the county is used for pasture and dairy land, while 43 percent is forested, 18 percent is urban and built-up area or surface water area, four percent is cropland, and two percent is considered "other" (NRCS, 1997). The major agricultural enterprises in the county are livestock, timber, roses, nursery stock, and peaches. (Please note that the National Resources Conservation Service [NRCS] data published in 1997 referenced here and throughout the document remains the most current land cover mapping information available.)

The climate is characterized by long, hot summers fueled by moist tropical air from the Gulf of Mexico. Winters are cool and fairly short. Precipitation is fairly heavy throughout the year, averaging about 44 inches.

1.C.2. Project Area Conditions

The project area is bounded on the south by IH 20 at its intersection with the future Loop 49 West and extends north to US 69 just south of its crossing over Duck Creek, a primary drainage to the Sabine River in the region. The project is located west of the city of Lindale and east of the city of Hideaway. **Figure 1** illustrates the project area.

Physiographically, the project area is characterized by rolling hills with interspersed stretches of relatively flat terrain associated with stream floodplains. Two main creeks traverse the area, Stevenson Branch and Davis Branch (both tributaries of Duck Creek). The project area also includes tributaries to Prairie Creek and Long Brake Creek, which both drain into the Neches River, and a very small portion of Macs Creek that drains to the Sabine River. The vegetation of the project area is a mixture of dense forested areas interspersed with woods and grasslands.

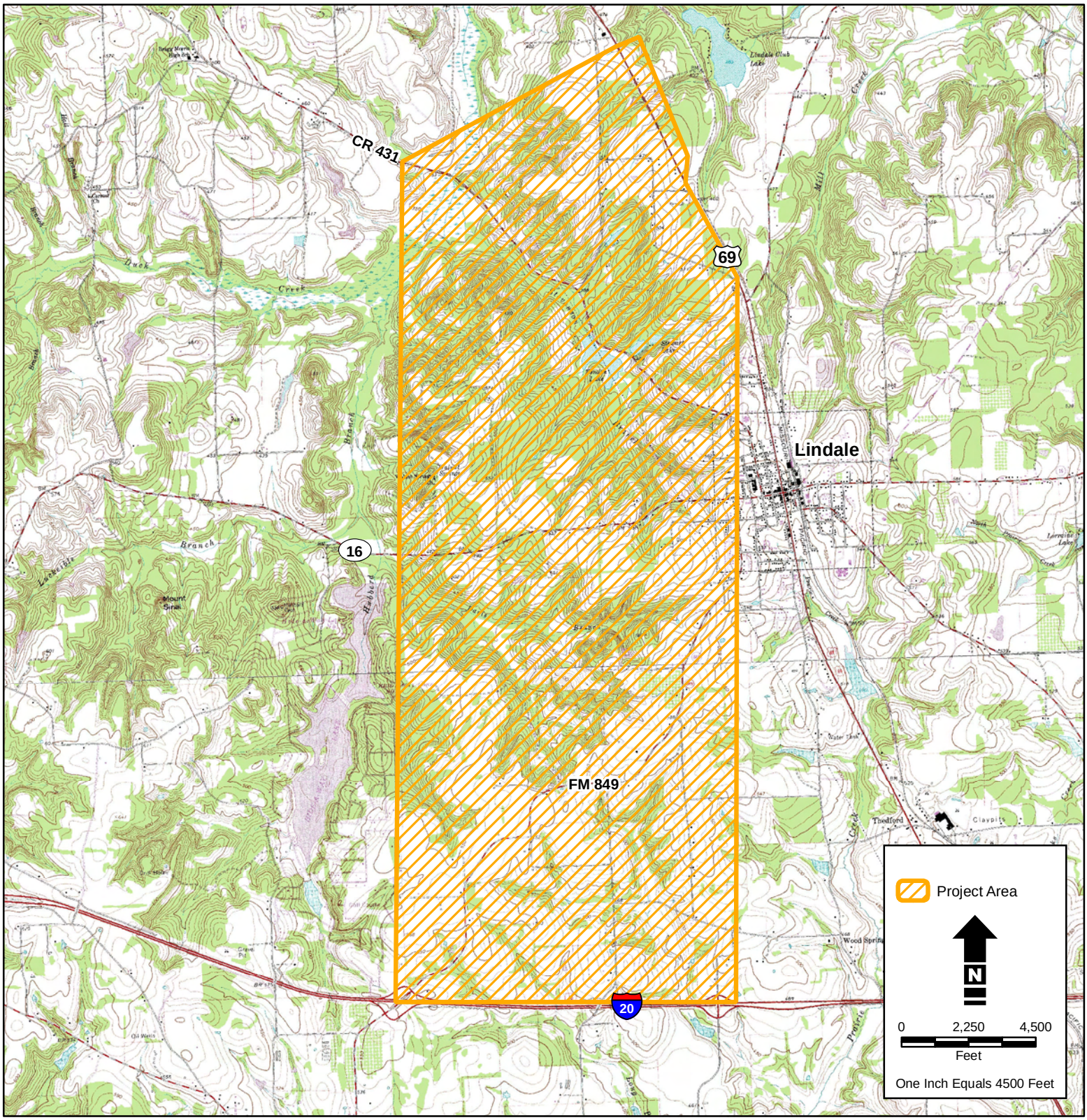
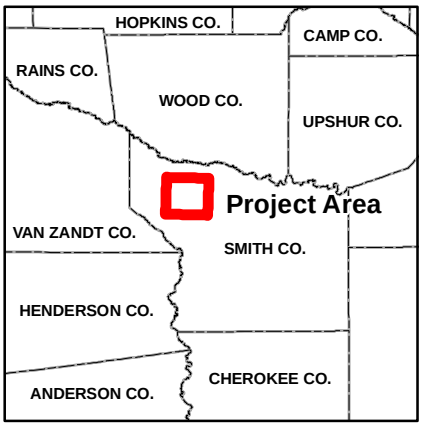


Figure 1

Project Area

CSJs: 0190-04-033



Although the vast majority is undeveloped, the project area contains suburban residential subdivisions, commercial properties, two religious encampments, and scattered rural homes.

1.C.3. Existing US 69 Facility

The US 69 roadway through Lindale consists of four main lanes. Stoplights are present at major intersections. Speeds along the roadway vary from 30 miles per hour (mph) through Lindale's downtown area to 45 mph, then 70 mph further from the town center.

The current design and pavement conditions of the existing US 69 roadway are not deficient according to TxDOT design standards; however, the limited capacity and low operating speeds of the roadway, along with related safety concerns associated with mixing high speed through traffic with local low speed access and turning traffic, have raised concerns about the ability of the current roadway to handle projected traffic volumes in a satisfactory manner. Projected traffic, Level of Service (LOS), and safety are addressed in more detail in **Section I.B.**

I.D. Project History: Planning and Environmental Coordination

I.D.1. Regional Transportation Plans and Projects

The proposed US 69 Lindale Reliever project is an element of a regional transportation system that has been under development for more than 20 years. The Lindale Reliever Route is associated with the Loop 49 project, a circumferential loop which, combined with IH 20, would encircle the city of Tyler, Texas (TxDOT, 2007c). The plans for Loop 49 envision several sections, each with independent utility (see **Figure 2**). The status of each of these sections is described below:

- Loop 49 South – The southern section of Loop 49 extends from State Highway (SH) 155 east to SH 110. This section was environmentally cleared when a Record of Decision (ROD) was issued in September 1998. Construction of this section was completed in phases. The segment from SH 155 to US 69 was opened to traffic in August 2006 and as a toll road in November 2006 as the first Electronic Toll Collection (ETC) road in Texas. The segment of the project that extends from US 69 to Farm-to-Market Road (FM) 756 was completed in December 2007, opened to traffic in January 2008, and initiated tolling in March 2008. The segment of the project that extends from FM 756 to SH 110 opened to traffic as a toll road in June 2012.

- Loop 49 West – The western section of the loop extends from SH 155, north to IH 20. Loop 49 West was constructed in phases as a toll facility. This section was environmentally cleared when a ROD was issued in November 2001. Construction

proceeded in phases, with the initial section consisting of a two-lane undivided facility and the ultimate section consisting of a four-lane divided facility. Segment 3A (the southern segment of Loop 49 West) was constructed using funding from the American Recovery and Reinvestment Act of 2009 while Segment 3B was constructed using a design-build format through the North East Texas Regional Mobility Authority (NET RMA), using loans that are anticipated to be repaid by toll receipts. Segment 3A opened to traffic as a toll road in November 2012, while Section 3B opened to traffic as a toll road in March 2013.

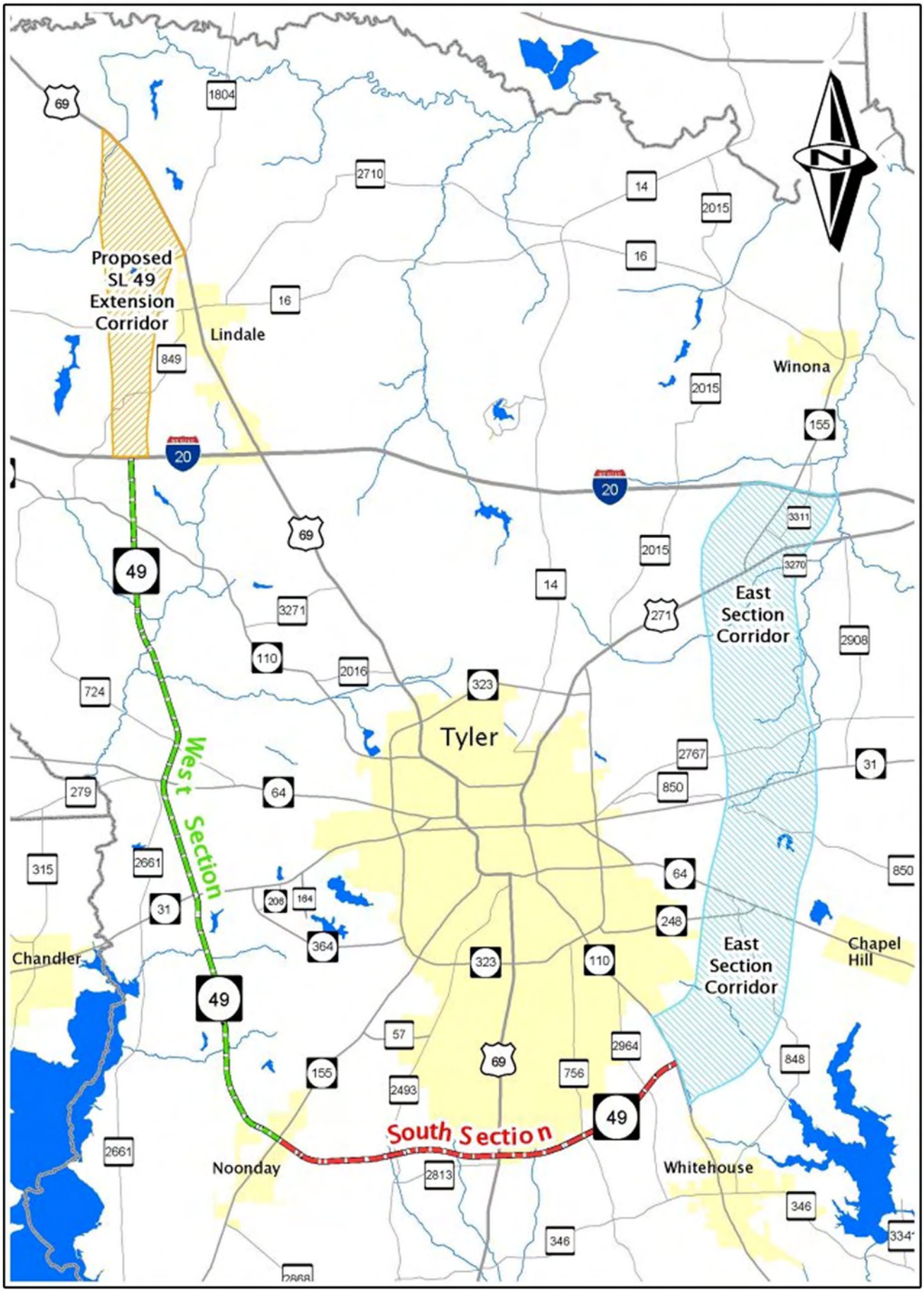
- Loop 49 East – The eastern section of Loop 49 will be a tolled facility connecting to Loop 49 South at SH 110 and extend north to IH 20 in the vicinity of SH 155. The eastern section is in a conceptual phase and is not currently under development.

- Loop 49 North – The northern section (the proposed Lindale Reliever Route discussed in this DEIS), would be a tolled facility connecting to Loop 49 West at IH 20, continuing north and tying into US 69 north of Lindale. Construction is anticipated to proceed in phases, with the first section consisting of a two-lane undivided facility, and the ultimate section consisting of a four-lane divided facility. The project will be funded with toll revenue bonds. The NET RMA has committed to issue these bonds and construct the Lindale Reliever Route as the next expansion of the toll system.

The proposed Lindale Reliever Route project is listed in the 2013–2016 Statewide Transportation Improvement Program (STIP) under Appendix C: Projects Undergoing Environmental Assessment. According to the STIP, the project is listed as Loop 49 (Ultimate 4-Lane Facility) (Toll), Project ID SM-30, with an estimated total project cost of $82.3 million (and a construction cost of $63.0 million). The project is also included in the Tyler Area Metropolitan Planning Organization's (MPO's) Metropolitan Transportation Program (MTP) 2035 as Loop 49 (Segment 4) as a tolled facility. Excerpts from the STIP and MTP are included in **Appendix E**.

A project-level toll analysis of the proposed roadway is provided at **Section IV.B.3.e**. A Regional Toll Analysis will be completed by TxDOT and the Tyler Area MPO and included in the Final EIS to evaluate potential tolling effects on low income and minority communities.

The proposed Lindale Reliever Route project is included in the City of Lindale's most recent comprehensive plan, the Second Century Comprehensive Plan (City of Lindale, 2004). The City of Lindale views the proposed reliever route as playing a "major role in the City's ability to redefine the US 69/Main Street gateway corridor." A major goal of the plan is to "reclaim US 69 as Lindale's 'Main Street' and its principal gateway corridor into the community," rather than its current role as a major regional pass-through highway. Construction of this proposed reliever route would assist the City of Lindale in achieving this goal.



MAP NOT TO SCALE

Figure 2
State Loop 49 Project

I.D.2. Planning and Environmental Coordination and Studies

I.D.2.a. Overview

The TxDOT Tyler District began studying the feasibility for a reliever route for US 69 in the city of Lindale, Texas, in 1999. The planning and environmental processes for the US 69 Lindale Reliever project have been more or less continuous since 1999, when the feasibility study was initiated. Following the decision in Fall 2005 to elevate the project to the Environmental Impact Statement (EIS) level under NEPA, the project development process adopted the (then new) interagency coordination requirements of the Safe, Accountable, Flexible, Efficient Transportation Equity Act-A Legacy for Users (SAFETEA-LU) §6002, which were integrated with the public involvement and scoping process requirements for the EIS under NEPA. This phase of project development continued until the conclusion of the scoping process and the completion of the SAFETEA-LU Coordination Plan, which was submitted to the joint lead agencies (TxDOT and FHWA in February 2007. The approved version is included in **Appendix E**.

This integrated planning and environmental process is summarized chronologically in **Table 4**, US 69 Lindale Reliever Route DEIS Summary of Project Coordination Activities and Documents. **Table 4** links each progressive phase of the project with a set of agency participants, opportunities for stakeholder and public involvement, and the preparation of engineering, planning, and environmental reports which provided objective data and analysis to support advancement of the project to the next development stage. The DEIS scoping process involved coordinated work by the joint lead and participating agencies to develop the project need and purpose and review the alternative corridor screening process. The project's Final Coordination Plan approved the need and purpose statement and alternatives analysis methodology, which would identify reasonable alternative alignments for more detailed study in the DEIS. The scoping period concluded with the presentation of the results of the Corridor Study to the joint lead and participating agencies. The Corridor Study, completed July 27, 2007, evaluated seven corridor alternatives (Corridors A-G) that resulted from the feasibility study as well as a reasonable number of alignment alternatives within the study corridors. The result of the Corridor Study was the recommendation of two reasonable alternatives (Alternatives D and G) to be carried forward, along with the No Build Alternative, for detailed evaluation in the EIS document. A detailed account is provided in **Chapter II, Alternatives Analysis**, of the project planning and environmental coordination phases, including the criteria and methods for the screening of alternative corridors during the scoping period. The Final Coordination Plan and other procedural documents are included in **Appendix E, Agency Coordination**, and **Appendix F, Public Involvement**. The results of the environmental impact assessment of the

build alternatives and the No Build Alternative are presented in **Chapters IV** through **VI** of the DEIS.

I.D.2.b. Feasibility Study

Completed in 2001, the feasibility study evaluated engineering considerations and potential environmental impacts of various design alternatives for the reliever route (TxDOT, 2001). The study area for the feasibility study consisted of an approximately five-mile by five-mile area north of IH 20 roughly centered on the existing US 69 route. The feasibility study evaluated alternative corridors to the east and west of the existing US 69 alignment, as well as alternative end points at US 69 in the north and IH 20 in the south. After reviewing route alternatives to the east and west of the existing US 69, identifying environmental concerns and assessing traffic conditions both with and without the proposed reliever route, the study recommended further investigation of four routes to the west of US 69. The preference for western route alternatives was primarily influenced by the need to avoid existing development to the east of US 69 in Lindale and the desire to develop a shorter project with fewer high-cost grade separations. The IH 20 intersection location was influenced by design interchange spacing requirements taking into consideration existing interchange locations both east and west of the proposed terminus and the desirability of linking the southern terminus of the proposed Lindale Reliever Route with the future northern terminus of Loop 49 West at IH 20 northwest of Tyler. The feasibility study recommended that the Lindale Reliever Route should extend north from the future Loop 49 West terminus and tie in to US 69 north of the city of Lindale. The east-of-Lindale route and alternative options for the IH 20 terminus are discussed in more detail in **Chapter II, Alternatives Analysis**. In 2004 an additional route was added further to the west for study purposes since development had occurred on the west side of Lindale since the completion of the feasibility study.

A Draft Corridor Summary Report was prepared in 2005 (TxDOT, 2005). Following completion of this report, it was determined that the project merited development as an EIS and that the project would be considered as a potential candidate for tolling. The decision to prepare an EIS, as opposed to an Environmental Assessment (EA), was driven by the size of the impact scenario and local controversy surrounding alignment selection. A Notice of Intent (NOI) to develop an EIS for the project was published in the Texas Register on August 11, 2006, and in the Federal Register on August 18, 2006. With the elevation to the EIS level, the project moved to the next development phase, the EIS scoping process and preparation of a Coordination Plan under SAFETEA-LU §6002.

Table 4 US 69 Lindale Reliever Route DEIS Summary of Project Coordination Activities and Documents					
Line	**Project Phase**	**Participants**	**Document or Activity**	**Date**	**Outcome**
1	Project Planning – Feasibility Study 1999 – 2005	Steering Committee, Cities of Lindale & Hideaway, property owners, public	Public/Steering Committee Meetings 1st Public Open House Steering Committee Meeting 2nd Public Open House	Feb 7, 2000 Apr 13, 2000 Nov 18, 2004 Jan 5, 2005 Jun 28, 2005	Presented project to community leaders, property owners, homeowners associations Presented project, including tolling Presented corridor alternatives Attended by 530 people; opposition from west (Hideaway) and east (Timberline Baptist Camp, etc.,) property owners; support from officials and business leaders. Presented Identification of preferred corridor.
2		TxDOT District, public, Steering Committee, consultants	Feasibility Study for Lindale Reliever Route in Smith County, Texas	Initiated 1999; doc. submitted May 15, 2001	Need for Project. Principal finding was need for improved mobility, reduced congestion, and improved safety on US 69 from IH 20 through Lindale. Alternative corridors, 2 main routes evaluated east and west of Lindale; east route dropped after 1st meeting. Four 1,000 ft-wide corridors (A–D) west of City identified after 2nd Steering Committee meeting (Apr 2000).
3		TxDOT District, Steering Committee, consultants	Feasibility Study Update(s) (Draft Corridor Summary Report)	2004 Feb 15,2005	A 5th corridor (E, furthest west) was added in a 2004 update in consideration of avoiding development that occurred since completion of initial study. Preliminary preferred corridor identified.
4	NEPA decision	TxDOT, FHWA	Project elevated from EA to EIS	Fall 2005	Considered size of new location project, extent of potential environmental impacts, and potential opposition from landowners along preliminary preferred corridor
5	Notice of Intent to prepare EIS	TxDOT, FHWA	Publication in Federal Register Publication in Texas Register	Aug 18, 2006 Aug 11, 2006	NOI stated project “Would serve as a connector between Loop 49 and US 69 and address safety, mobility, connectivity, and capacity needs.” Also states “agency scoping meeting is anticipated…in September 2006 to coordinate and solicit agency representatives’ input on …purpose and need and the range of alternatives…”

Table 4 US 69 Lindale Reliever Route DEIS Summary of Project Coordination Activities and Documents (continued)					
Line	**Project Phase**	**Participants**	**Document or Activity**	**Date**	**Outcome**
6	DEIS Scoping	TxDOT, public, stakeholders	1st Public Scoping Meeting	Sep 25, 2006	Draft Need & Purpose (N&P), range of 5 Build Alternatives presented. 115 attendees, City of Hideaway presented petition opposing Corridor E (nearest to Hideaway) signed by 266 residents.
7		Joint Lead and Participating Agencies, Public	1st Joint Lead and Participating Agency Coordination Meeting	Nov 16, 2006	Draft N&P discussed. Reviewed alternative corridors. Two additional alternative corridors (Corridors F and G) added. Approved impact assessment criteria. Broad categories were cost and engineering; safety and access; social/human environment; and natural environment. Agencies ranked criteria for impact assessment: social impacts No. 1.
8		Agencies, Public	2nd Agency and 2nd Public Scoping Meeting	May 22, 2007	Alternatives and revised list of methodologies (criteria) presented. Corridors D and G favored. City of Hideaway representatives attended, did not comment. No additional requests for changes.
9		TxDOT District, consultants	US 69/Loop 49 North Lindale Reliever Route EIS Corridor Study	Report submitted July 27, 2007	Seven corridor alternatives assessed according to 55 criteria (engineering, cost, safety, access, social/human environment, and natural environment). Apparent public preference for west alignment or No Build. Evaluation resulted in identification of Alternatives D and G as reasonable alternatives along with the No Build Alternative.
10		Agencies, Public	3nd Agency and 3rd Public Scoping Meeting	Nov 27, 2007	Presented Build Alternatives D and G plus No Build Alternative as reasonable alternatives to be studied in detail. More detailed design information on Alternatives D and G presented.
11	Coordination Plan SAFETEA-LU §6002	Joint Lead and Participating Agencies	Draft Coordination Plan Draft Coordination Plan Draft Coordination Plan	Aug 14, 2006 Nov 6, 2006 Dec 21, 2006	Drafts addressed the following topics: development of N&P, range of alternatives, collaboration on impact assessment methodologies, and future steps in the process, including completion of DEIS, identification of preferred alternative and level of design detail, completion of FEIS & ROD.
12		Agencies	Final Coordination Plan	Feb 22, 2007	Milestone VI, p. 8: "after the completion of the scoping process, the Joint Lead Agency (TxDOT) will develop a reasonable number of alignment alternatives (at least two), which will be carried forward (along with the No Build Alternative) for detailed evaluation in the EIS document. All reasonable alternatives, as well as the No Build, will be evaluated to an equivalent level of detail in the DEIS document." N&P statement attached to Final Coordination Plan, which is included in Appendix F of this DEIS.
13		FHWA	Concurrence letter from FHWA	Apr 3, 2007	FHWA concurrence with Final Coordination Plan (Appendix F).

Table 4 US 69 Lindale Reliever Route DEIS Summary of Project Coordination Activities and Documents (continued)					
Line	**Project Phase**	**Participants**	**Document or Activity**	**Date**	**Outcome**
14	Agency coord. update	Agencies, Public	4th Agency and 4th Public Meeting	June 10, 2008	Identified preliminary locally preferred alignment based on Corridor Study -- Alternative G.
15	Draft EIS	TxDOT District, consultants	DEIS preparation and submittal	Aug 2006 Jan 2008 Sep 2008	DEIS work initiated. Baseline data collection, coordination Field investigations, Impact assessment, GIS analysis (initiated after end of scoping, identification of reasonable alternatives D and G Draft document submitted to District
16		TxDOT District, consultants	Comment response and document revisions	Sep 2008 to present	Revisions over 3.5 years resulting from changes in agency rules, guidance documents, policies, changed conditions or additional data available.
17	Public hearing	TxDOT, FHWA, public	Public hearing on DEIS	TBD	Pursuant to FHWA finding of satisfactory for further processing.

I.D.2.c. SAFETEA-LU Environmental Review and NEPA Scoping Process

Section 6002 of SAFETEA-LU, passed in 2005, defines the roles of the various agencies involved in the planning process, requires the coordination and scheduling of agency reviews, and specifies a process to avoid interagency disagreements. The SAFETEA-LU environmental review process for projects requiring preparation of an EIS and the steps taken during the planning process for this project are summarized in **Table 5**.

Table 5 SAFETEA-LU Environmental Review Process

SAFETEA-LU Requirement	How Addressed for Lindale Reliever Route
1. Publication of NOI	NOI to prepare an EIS for the Lindale Reliever Route was published in Federal Register on August 18, 2006, and in the Texas Register on August 11, 2006.
2. Notification of lead Federal agency at U.S. Department of Transportation	TxDOT has notified the appropriate FHWA representative.
3. Invitation to participating and cooperating agencies – letters of invitation must be mailed out soliciting comments on the Draft Need and Purpose and providing them with the draft Coordination Plan and project schedule. If the project schedule is later modified, the modified schedule must be provided to all agencies. The agencies are allowed 30 days to provide comments.	Letters including the draft Need and Purpose, draft Coordination Plan, and project schedule were sent to the following agencies: Smith County, Tyler MPO, City of Lindale, City of Hideaway, Smith County Historical Commission Chair, Texas General Land Office, USDA-Natural Resources Conservation Service, Texas Railroad Commission, Texas Commission on Environmental Quality, Environmental Protection Agency, U.S. Army Corps of Engineers, Tribal Coordination, State Historical Preservation Office, Texas Historical Commission, Texas Parks and Wildlife Department, U.S. Fish and Wildlife Service, Sabine River Authority, East Texas Council of Governments, and Northeast Texas Regional Mobility Authority. A Scoping Meeting was held on September 25, 2006, to present the Need and Purpose, draft Coordination Plan, and project schedule.
4. Provide public involvement opportunity to solicit comments on project Need and Purpose and to provide the project schedule. If the project schedule is later modified, the modified schedule must be shared with the public. The public comment period is not to exceed 30 days.	A Scoping Meeting was held on September 25, 2006, to discuss the Need and Purpose, draft Coordination Plan, and project schedule. After FHWA approval of the project Need and Purpose (on April 3, 2007), a Scoping Meeting and a Participating Agency Meeting were held on May 22, 2007, to present it to agencies and the public.
5. Identification of range of alternatives, including the solicitation of comments from agencies and the public on project alternatives. The comment periods for both agencies and the public are not to exceed 30 days.	A Participating Agency Meeting, which included the public, was held on November 16, 2006, to present the preliminary study corridors and corridor evaluation criteria. On November 27, 2007, Public Scoping and Participating Agency Meetings were held to present the reasonable alternatives (Alternatives D and G) to agencies and the public.
6. Collaboration on impact assessment methodologies	TxDOT has taken under consideration input from agencies regarding impact assessment methodologies.
7. Completion of DEIS and publication of notice in the Federal Register. The comment period for agencies and the public is not to exceed 60 days	The DEIS (current document) is currently underway.
8. Identification of the preferred alternative and the level of design	Alternative G is identified in this DEIS as the technically preferred alternative and the level of design has been determined.
9. Completion of the Final EIS	To be completed in a subsequent step.
10. Completion of Record of Decision (ROD)	To be completed in a subsequent step.
11. Completion of permits, licenses, or approvals, after the ROD	To be completed in a subsequent step.

The following agencies were involved in the SAFETEA-LU Coordination Plan process:

Federal Lead Agency
FHWA

Joint Lead Agency
TxDOT

Cooperating Agency
U.S. Army Corps of Engineers (USACE)

Participating Agencies
City of Hideaway
City of Lindale
City of Tyler
East Texas Council of Governments (ETCOG)
North East Texas Regional Mobility Authority (NETRMA)
Sabine River Authority
Smith County
Smith County Historical Commission
State Historical Preservation Office (SHPO)
Texas Commission on Environmental Quality (TCEQ)
Texas General Land Office (TGLO)
Texas Historical Commission (THC)
Texas Parks and Wildlife Department (TPWD)
Texas Railroad Commission (TRRC)
Tyler Chamber of Commerce
Tyler Metropolitan Planning Organization
Tyler Metro Chamber of Commerce
U.S. Natural Resources Conservation Service (NRCS-Tyler Office)
U.S. Environmental Protection Agency (EPA)
U.S. Fish and Wildlife Service (USFWS)
Tribal Agencies (see **Appendix E** for complete list)

I.D.3. Public Involvement

Several public involvement activities took place during the planning and environmental phases of the project, as detailed below. These public events are also identified in **Table 4**. Copies of meeting summaries and other materials from these meetings are included in **Appendix F**. The complete public involvement record is on file at the TxDOT Tyler District office. Notice will be

provided and a public hearing will be held once FHWA approves the Notice of Availability (NOA) for the DEIS. The public involvement process for the Lindale Reliever project exceeds the minimum required by rule in 43 TAC §2.5.

- February 7 and April 13, 2000, Steering Committee Meetings – These meetings presented the project and study corridor to local community leaders, potentially affected property owners, and homeowners associations.

- November 18, 2004, Open House Public Meeting – This meeting was held at Lindale High School to present the potential for toll funding of the project. Approximately 95 people attended the meeting. This meeting was advertised in the Lindale News & Times, the Mineola Monitor, and the Tyler Morning Telegraph on October 19 and November 9, 2007 and in Spanish in the La Opinion on the same dates. Comments received included individuals and groups opposed to the facility near their location of interest and concern over possible impacts to life and property. The project was supported by local and regional elected officials and business leaders.

- January 5, 2005, Steering Committee Meeting – This meeting was held to present the corridor alternatives.

- June 28, 2005, Public Meeting – The purpose of the meeting was to present the project and preliminary alignments. The meeting notice was published in the Tyler Morning Telegraph on June 20, 2005 and in Spanish in the La Opinion newspaper. Approximately 530 people attended the meeting. Comments received included individuals and groups opposed to the facility near their location of interest and concern over possible impacts to life and property. The project was supported by local and regional elected officials and business leaders.

- August 11 and August 18, 2006, Texas Register and Federal Register Notices – NOI to prepare an EIS for the project was published in the Federal Register on August 18, 2006 (FR 06-7012; volume 71, number 160, pages 4786-47862); the NOI was published in the Texas Register on August 11, 2006 (31 TexReg 6425-6426).

- September 25, 2006, Scoping Meeting – This meeting was held at Lindale Intermediate School to present the Need and Purpose, draft Project Coordination Plan, and project schedule. The meeting notice was published in five newspapers: The Lindale News & Times on August 24, 2006 and September 14, 2006; the Tyler Morning Telegraph and Tyler Courier-Times Telegraph on August 27, 2006 and September 16, 2006; and, the Mineola Monitor on August 30, 2006 and September 6, 2006. This meeting was also advertised in Spanish in the La Opinion newspaper on April 25, 2007 and May 9, 2007.

Approximately 115 people attended, 86 of whom were members of the public. The meeting consisted of an open house question and answer session, followed by a formal presentation. A total of 15 comments were received at the meeting.

- November 16, 2006, Participating Agency/Affected Property Owner Meeting – This meeting was held to present the preliminary study corridors and corridor evaluation criteria to affected property owners, participating agencies, and members of the public. The draft Need and Purpose as well as the draft Project Coordination Plan was presented and discussed. It was advertised by means of direct mail notice. Direct mail invitations were sent to 36 Participating Agencies, and one Cooperating Agency (USACOE). Besides direct mailing, some of the local invited agencies (such as Smith County, the City of Lindale, and the City of Hideaway) invited key property owners or citizen representatives to the meeting. Approximately 19 people attended this meeting, including 12 agency representatives and seven members of the public. A Corridor Evaluation Criteria & Relative Importance Factor Survey was provided to those in attendance to list and rank project concerns with a 30-day submission deadline. The survey revealed the following relative ranking (highest to lowest) of corridor evaluation criteria: Social Impacts, Project Safety and Access, Project Cost and Engineering, and Natural Environment.

- May 22, 2007, Scoping Meeting and Participating Agency Public Meeting – This meeting was held to present the need and purpose, Coordination Plan, and the method and evaluation criteria for screening the project corridors, property owners, participating agencies, and the public. Notice for the meeting was published in the Tyler Morning Telegraph on April 23 and May 13, 2007. It was also advertised in the Mineola Monitor and Lindale News & Times on April 25 and May 9, 2007 and in Spanish in La Opinion on the same date. A total 112 people attended the meeting and two verbal and 41 written comments were received.

- November 27, 2007, Scoping Meeting and Participating Agency/Affected Property Owner Public Meeting – These meetings were held at the First United Methodist Church of Lindale to present the range of reasonable alternatives to the public and to participating agencies. Each of the meetings consisted of an open house question and answer session, followed by a formal presentation. They were advertised by means of direct mail notice (183 notices mailed) to affected property owners and agencies and by two newspaper advertisements: in the Lindale News & Times and the Mineola Monitor on October 31 and November 14, 2007, in the Tyler Morning Telegraph on October 28 and November 18, 2007, and in Spanish in La Opinion on October 31 and November 14, 2007. Approximately 78 members of the public and one elected public official attended the scoping meeting; 63 property owners, 14 agency personnel, and one member of the press

attended the participating agency meeting. A total of 23 verbal comments and 13 written comments were received. Comments were largely in favor of the project, and the majority of the comments expressed support for Alternative G.

- June 10, 2008, Participating Agency/Affected Property Owner Public Meeting – This meeting was held to present the locally preferred alternative to the public. The meeting was held at the First United Methodist Church of Lindale and consisted of an open house followed by a formal presentation. The meeting was advertised by means of direct mail notice and newspaper advertisement. Approximately 88 members of the public, three elected public officials, and 22 representatives of TxDOT were in attendance. A total of five written comments and ten verbal comments were received at the meeting. Comments were generally in favor of the project and the locally preferred alternative. Some concerns were expressed regarding proximity to a bed and breakfast, access to adjacent properties, and tolling.

II. Alternatives Analysis

II.A. Overview of the Planning and Environmental Processes

This chapter of the DEIS provides an account of a decade-long planning process that evaluated alternative designs and roadway routes leading to the identification of a technically preferred alternative alignment for the proposed Lindale Reliever Route. The process integrated engineering, environmental, and transportation planning technical disciplines with an active and continuing stakeholder and public involvement program. The sequence of planning, environmental, agency coordination and public involvement events that supported the project alternatives analysis is described in the preceding chapter and summarized in **Table 4**.

The DEIS for the Lindale Reliever Route project was initiated with the publication of the NOI on August 18, 2006. FHWA guidance for developing a Coordination Plan under §6002 of SAFETEA-LU provides that:

> "…lead agencies must give the public the opportunity for involvement during the development of the purpose and need statement and the identification of the range of alternatives to be considered… In developing the alternatives, the lead agencies must provide opportunities for the involvement of participating agencies and the public and must consider the input provided by these groups. After considering this input, the lead agencies will decide the range of alternatives for analysis" (FHWA, 2006).

Publication of the NOI also marked the start of the DEIS scoping process, which the CEQ describes at 40 CFR 1501.7. The identification and evaluation of project alternatives was an important element in the 2006-2007 SAFETEA-LU coordination plan process, which integrates the NEPA scoping process. The coordination plan process afforded the participating agencies and the public opportunities to be involved in developing the project need and purpose statement and the methods for identifying the range of alternatives to be studied in the DEIS. Similarly, the scoping process provided a framework for screening the various alternative design concepts and corridors that had been put forward during the planning and feasibility phase. The screening of seven preliminary corridors and identification of two Build Alternatives and the No Build Alternative was carried out in accordance with recent guidance from FHWA's Office of Chief Counsel:

> "The number of alternatives studied in detail in an EIS may be reduced through a screening process conducted during scoping" (FHWA, 2010).

Regional Planning Considerations Affecting Design and Routing Alternatives

The existing US 69 facility through Lindale raises mobility concerns associated with traffic congestion. Preserving and enhancing future mobility is an important transportation planning objective, since the facility is part of the Texas Trunk System. In response to highway network improvement requests in the mid-1980s, the Texas Trunk System was developed in 1988 as a network of rural divided highways that compliments and functions with the Interstate Highway System. It is intended to serve as a main connector for Texas cities with populations exceeding 20,000. Routes included in the Texas Trunk system are evaluated based on the criteria outlined in 43 TAC §16.56. These criteria include routes: 1) maximizing the use of existing four-lane divided roadways; 2) minimizing circuitous or indirect routing; 3) connecting with principal roadways from adjacent states; 4) connecting with principal deep water ports with channel depths of 40 feet or more; 5) connecting with principal Mexican ports of entry; 6) serving significant military or other national security installations; 7) serving tourism or recreational areas; 8) comprising major truck routes; 9) which are within 25 miles or less of cities of 10,000 population or greater; 10) closing gaps in the existing state highway system; and 11) providing system connectivity.

The proposed Lindale Reliever project has been included in multiple planning documents developed by the Tyler Metropolitan Planning Organization (MPO), designated by the City of Tyler in 1974. The MPO consists of two standing committees, the Policy Committee and the Technical Committee, and is tasked with executing the urban transportation process in accordance with federal legislation. The transportation planning study area for the Tyler MPO includes the city of Tyler and several other developing areas including Lindale, which, along with the city of Hideaway, forms the northern boundary of the MPO study area. The Tyler MPO aims to provide continuity with the various transportation planning and improvement areas within those areas most likely to experience urbanization during the 20-year planning horizon (City of Tyler, 2009).

II.B. Alternatives Considered During Planning and Feasibility Studies

II.B.1. Threshold Issues: Design Concepts, Routing, and Tolling Options

A feasibility study was conducted in 2001 to evaluate options for improving north-south mobility along US 69 from IH 20 to north of the city of Lindale. A Steering Committee consisting of various elected officials, business interests, and citizens of Lindale was organized to assist TxDOT in assessing community issues related to the various options. Two Steering Committee meetings were held in Lindale, the first on February 7, 2000, and the second on April 13, 2000. Key questions initially addressed by the Steering Committee were the type and route locations of roadway improvements, the location of the IH 20 connection, and project funding options.

- Option of Adding Lanes to Existing US 69. The Steering Committee and transportation planners concluded that improving the existing US 69 facility by adding lanes would not achieve the desired mobility in the future due to the lack of access control and the numerous driveways and intersecting streets along the roadway. Widening alternatives through the city of Lindale were therefore not considered feasible alternatives due to conflict with existing development along the existing route.

- East-West Options. The study area evaluated for the feasibility study was an approximately five-mile by five-mile area north of IH 20 roughly centered on the existing US 69 route. Two main routing corridors for the proposed project were evaluated: one to the east of the city of Lindale and one to the west (TxDOT, 2001). The feasibility study found that the environmental impacts of the western route were generally similar and less adverse than those of the route on the east side of US 69. A western route was deemed more appropriate than an eastern route based on several factors, including the future construction of Loop 49 West and traffic-generating residential communities and businesses to the west of Lindale which would benefit from construction of a reliever route. Following comments received at the first Steering Committee meeting (February 7, 2000), the western route was carried forward for further consideration. Based on input from the second Steering Committee meeting (April 13, 2000) and the environmental considerations evaluated in the feasibility study, four potential 1,000-foot wide corridors were identified for evaluation as western alternative routes.

- Location of IH 20 Intersection. The IH 20 intersection location along the reliever route was influenced by design interchange spacing requirements taking into consideration existing interchanges at alternative locations both east and west of the proposed terminus. Initial constraints or planning considerations identified for the four western routes include the future northern terminus of Loop 49 West, the city of Hideaway, Target Distribution Center, Prairie Creek and associated waterways, Timberline Baptist Encampment, Faulkner Park, and the Hubbard and Stevenson Branches of Duck Creek (TxDOT, 2001). When reviewing overall system linkage with a reliever facility west of Lindale, using and incorporating the planned Loop 49 West facility tying to IH 20 west of Lindale was investigated. For this project, tying to Loop 49 West allows for a US 69 relief route with utility not only for Lindale but also for Tyler as well. Continuing the access control and design features matching Loop 49 segment south and west of Tyler was recommended for driver expectancy and mobility needs.

- Tolling Options. Additional funding methods were introduced to the project planning process to take advantage of tolling options after organization of the NET RMA in 2004. As the fifth Regional Mobility Authority in Texas, the NET RMA seeks to enhance mobility in the North East Texas Region by "educating the public on toll roads and advancing the completion of infrastructure projects in North East Texas ahead of schedule from traditionally funded projects" (NET RMA 2010). This project would be funded with toll revenue bonds. The NET RMA has committed to issue these bonds and construct the Lindale Reliever Route as the next expansion of the toll system.

- Travel Demand Management (TDM). TDM is a concept which seeks to increase roadway efficiency through demand management strategies without increasing capacity by expanding infrastructure. According to FHWA (2009), management of traffic demand "is about providing travelers, regardless of whether they drive alone, with travel choices, such as work location, route, time, and mode." A TDM alternative could include changing travel behavior in order to reduce traffic during congested periods and could include strategies such as congestion pricing, park-and-ride facilities, ridesharing programs, and encouragement of bicycle and pedestrian choices. Though TDM strategies can play an important role in the reduction of congestion on roadways, they are not well-equipped for addressing the deficiency of the current facility with respect to its low operating speeds, limited capacity, and safety concerns associated with mixing high-speed through-traffic with local, low-speed traffic and turning traffic. Because TDM strategies would not sufficiently address the need to alleviate congestion on US 69 through Lindale and enhance connectivity in the regional transportation system, the TDM alternative was not considered for further analysis.

II.B.2. Traffic and Environmental Constraints Analyses

Traffic analysis conducted for the proposed reliever route feasibility study indicated that construction of the proposed roadway would reduce accidents and congestion for through traffic. Anticipated traffic data for 2007 and 2027 developed by TxDOT in 2000 were used for the analysis, along with obtained existing traffic volume data collected along US 69 through Lindale in 1999. From these traffic data, an LOS analysis was performed. Traffic and LOS analyses are discussed in detail in **Section I.B.1.c**. Construction of the reliever route would also improve safety for the through traffic, as well as local traffic and pedestrians in the downtown Lindale area.

The feasibility study recommended that TxDOT further analyze four potential corridors identified west of US 69. One factor in this recommendation was TxDOT's plan to construct

Loop 49 West. The intersection of Loop 49 West and IH 20 would serve as a logical southern terminus of the proposed Lindale Reliever Route. A number of environmental considerations were evaluated with regard to the construction of the US 69 Reliever Route around Lindale. Pertinent resource categories related to the human and natural environment were investigated in order to evaluate the magnitude of potential environmental constraints associated with the various route alternatives. Resource categories evaluated include:

- Social and economic impacts
- Land use impacts
- Water resources including wetlands and waters of the U.S.
- Hazardous materials
- Air quality impacts
- Traffic noise impacts
- Ecological resources including vegetation, wildlife, and threatened and endangered species
- Cultural and historic resources

The feasibility study addressed regulatory compliance requirements, permitting, and potential mitigation issues for each of the resource categories. Environmental impacts that might be identified during subsequent impact analysis would be avoided, minimized, or mitigated. The feasibility study further recommended that the route be selected as soon as practicable, due to the continued growth of Lindale impacting currently available corridors, and that the reliever route around the city of Lindale should be constructed.

In 2004 an additional route was added further to the west for study purposes. This was Corridor E, the closest one to the city of Hideaway, and it was added for the purpose of avoiding development that had occurred since the beginning of the feasibility study.

II.C. DEIS Scoping Phase Screening of Preliminary Corridors

II.C.1 Scoping/Coordination Plan Procedures

After the project was elevated to an EIS in August 2006, the NEPA scoping process and SAFETEA-LU coordination planning process were initiated. The NOI for initiation of the EIS process was published in the Federal Register on August 18, 2006. As joint lead agencies, FHWA and TxDOT provided cooperating and participating agencies and the public with opportunities to be involved in developing the project need and purpose statement and the range of alternatives to be considered. The first public scoping meeting was held on September 25, 2006, and the five corridor alternatives (Corridors A–E) initially identified during the feasibility and corridor planning studies were presented. The majority of the speakers at this meeting were

opposed to Corridor E and/or expressed concern regarding impacts to the city of Hideaway. A petition signed by 266 residents of the city of Hideaway opposing Corridor E was also received.

Agency Input on Evaluation Criteria. On November 16, 2006, a similar meeting was held for participating agencies. The range of alternatives was presented and discussed, along with a set of preliminary corridor evaluation criteria to be used in the analysis of alternatives. Participating agencies were given the opportunity to review and comment on the range of alternatives and to collaborate with FHWA and TxDOT on the appropriate impact assessment methodologies and level of detail to be used in the EIS. This agency input also resulted in additional evaluation criteria: Light pollution was added as a corridor evaluation criterion at the request of the City of Hideaway, and TPWD requested that wildlife habitat impacts be divided into six subcategories and that the occurrence of state-listed and rare species be evaluated. This collaboration resulted in a revised list of criteria in the broad categories of: project cost and engineering; safety and access; social/human environment; and natural environment. TPWD's recommendation to subdivide wildlife habitat into six subcategories was incorporated into the 2007 Corridor Study and subsequent DEIS assessment of ecological impacts.

Following this collaboration effort, two additional corridor alternatives were added. The additional Corridors F and G represented crossover segments allowing for avoidance of all or part of the closed Lindale landfill.

The Final Coordination Plan, submitted to FHWA on February 22, 2007, stated that,

> "after the completion of the scoping process, the Joint Lead Agency (TxDOT) will develop a reasonable number of alignment alternatives (at least two), which will be carried forward (along with the No Build Alternative) for detailed evaluation in the EIS document. All reasonable alternatives, as well as the No Build, will be evaluated to an equivalent level of detail in the DEIS document."

The Coordination Plan was approved by FHWA on April 3, 2007, and the Corridor Study was initiated. At the second set of public scoping meetings and participating agency meetings, held on May 22, 2007, TxDOT presented the revised list of methodologies proposed for the analysis of alternatives and the complete set of alternative corridors. **Figure 3** shows the seven alternative corridors as presented to the participating agencies and the public. Most of the public comments at this meeting expressed preference for the corridors furthest to the west or the No Build Alternative. No additional requests for changes were received from the participating agencies as part of this scoping meeting.

MAP NOT TO SCALE

TxDOT Tyler District

TXTAG

Figure 3
Preliminary Corridor Alternatives

II.C.2 Corridor Study

A Corridor Study Report was completed July 27, 2007, which summarized the evaluation of the seven corridor alternatives that resulted from the feasibility study (see **Figure 3**), including the input from the agencies and the public at the scoping meetings. Each corridor evaluated had a width of 1,000 feet. As a scoping document, the Corridor Study was intended to support the decision process of the joint lead and participating agencies by summarizing relevant information on environmental resources, land use, and socioeconomic conditions, thereby providing an overview of the relative suitability of the corridors for development of a new location transportation facility. The environmental objectives include the preservation, to the maximum extent possible, of the quality of the natural environment; the avoidance or minimization of conflict with existing and planned land uses, especially neighborhoods, schools, and other public facilities; compliance with applicable state and federal laws and regulations; and consistency with the plans and policies of the area cities and community organizations. **Table 6** and the following narrative present a comparison of the engineering criteria and potential environmental impacts of each of the corridors evaluated in the Corridor Study. Traffic, cost, and other data shown in **Table 6** were current as of the 2007 date of the Corridor Study Report. The table has not been updated because it provides an accurate representation of the information used at that stage of the planning process to identify reasonable alternatives to be studied in greater detail. More recent traffic data are provided in **Section I.B.1.a**. **Figure 4** shows the location of these corridors relative to environmental and planning constraints as of April 2012, including more recent information about existing and committed residential developments available from Smith County.

Table 6 Preliminary Corridor Evaluation

Criteria	Corridor A	Corridor B	Corridor C	Corridor D	Corridor E	Corridor F	Corridor G
Project Cost & Engineering Criteria							
Project length (miles)	5.2	5.2	5.3	5.9	6.5	6.4	6.2
Project Construction Cost (Million $)	$86.0	$80.8	$84.7	$92.6	$102.0	$98.5	$93.6
Project ROW and Utility Adjustment Cost (Million $)	$6.9	$10.0	$13.3	$5.0	$4.4	$4.9	$4.9
Project Construction + ROW Cost (Million $)	$92.9	$90.8	$98.0	$97.6	$106.4	$103.4	$98.5
Number of major utility crossings requiring adjustment	3	3	3	3	3	3	3
Ability to economically construct project in phases	Same	Same	Same	Same	Same	Same	Same
Existing Topography and Earthwork Requirements (Million CY/Mile)	0.53	0.51	0.42	0.77	0.89	0.78	1.04
Estimated Number of Residential Property Improvement Impacts	13	16	245	11	2	11	5
Estimated Number of Commercial Property Improvement Impacts	1	1	0	2	2	2	2
Project Safety and Access Criteria							
Number of Intersections	3	3	3	3	3	3	3
Skew of Interchanges (# skewed > 15 degrees)	2	2	1	1	0	0	1

1

Table 6 Preliminary Corridor Evaluation (continued)							
Criteria	**Corridor A**	**Corridor B**	**Corridor C**	**Corridor D**	**Corridor E**	**Corridor F**	**Corridor G**
Number of Grade Separations	11	15	15	9	8	10	8
Skew of Grade separations (# skewed > 15 degrees)	1	3	5	3	2	3	2
Access to Developing Areas (# Parcels)	38	35	38	35	31	36	32
Number of new access roads	3	2	1	1	3	2	2
Length of new access roads (miles)	0.3	0.2	0.1	0.1	1.4	0.2	0.9
Temporary Construction Effects (# of locations)	8	11	13	8	7	8	7
Social/Human Environment Criteria							
Commercial Land Use (acres)	13.28	10.05	17.49	23.08	13.64	27.86	23.13
Community Land Use (acres)	15.58	14.24	0	14.63	0	1.14	13.49
Church Land Use (acres)	0	0	3.5	0	0	0	0
Oil/Gas Land Use (acres)	3 (dry holes)	1 (dry hole)	2 (dry holes)	1 (dry hole)	0	0	1 (dry hole)
Park Land Use (acres)	0	0	0	0	0	0	0
Public Land Use (acres)	0	0	0	0	0	0	0
Residential Land Use (acres)	38.95	85.58	133.36	89.79	15.93	60.82	18.51
Mixed Residential/Commercial Land Use (acres)	0.1	0.1	0.1	0	0	0	0
School Land Use (acres)	0	0	9.2	0	0	0	0
Pedestrian and Bicycle Facilities (miles)	0	0	0	0	0	0	0
Air Quality – Attainment Issues	Same	Same	Same	Same	Same	Same	Same
Noise Levels – Receivers within Corridor	37	73	86	36	14	25	16
Historic and Archeological Assets (Recorded)	1	1	1	1	1	1	1
Cemeteries (acres)	0	0	14.08	0	0	0	0
Social and Economic Impact of Tolled Highway	Same	Same	Same	Same	Same	Same	Same
Hazardous Waste Sites (points)	0	0	0	1	0	1	0
Hazardous Waste Sites (old landfill) (acres)	0	0	0	0	21.79	12.18	0
Water Wells (recorded)	0	0	0	0	0	0	0
Light Pollution – Sensitive Receivers within Corridor	37	73	86	36	14	25	16
Mobile Source Air Toxics – Degree of Impact	Same	Same	Same	Same	Same	Same	Same
City and County Actions, Resolutions and Planning Documents					Hideaway Opposition	Hideaway Opposition	
Natural Environment Criteria							
Waters of the US/Wetlands (acres)	48.51	38.37	33.11	17.44	13.79	13.64	18.21
Waters of the US/Streams (linear feet)	9343	7767	7816	6216	7779	5067	8468
Water Quality – 303(d) listed streams	0	0	0	0	0	0	0
Developed vegetation (acres)	44.46	93.30	143.05	53.33	30.09	49.98	20.29
Pasture (acres)	148.33	187.71	176.29	218.11	261.06	215.59	290.39
Pine Forest (acres)	61.92	93.50	102.62	79.14	77.52	79.14	77.52
Pine/Hardwood Forest (acres)	364.46	239.69	201.63	346.13	412.42	393.54	362.72
Riparian Forest (acres)	0	0	0	4.02	0	4.02	0
Water (lake, open water) (acres)	12.14	13.40	11.52	18.45	0	0	18.45
Wildlife Habitat – Fragmentation of	Less	Less	Less	More	More	More	More

Table 6 Preliminary Corridor Evaluation (continued)							
Criteria	**Corridor A**	**Corridor B**	**Corridor C**	**Corridor D**	**Corridor E**	**Corridor F**	**Corridor G**
Wildlife Habitat							
Floodplains – number of crossings	2	1	1	2	2	2	2
Floodplains – acres	66.62	46.76	45.30	37.54	31.54	14.74	54.27
Threatened/Endangered Species – Federally Listed Occurrences	0	0	0	0	0	0	0
Threatened/Endangered Species – State-Listed Occurrences	0	0	0	0	0	0	0
Occurrence of State Tracked Rare Resources (other than state and federal T&E species)	0	0	0	0	0	0	0
Aesthetic and Scenic Quality – degree of constraint	Same	Same	Same	Same	Same	Same	Same
Indirect and Cumulative Effects on area resources	Same	Same	Same	Same	Same	Same	Same

Source: US 69/LP 49 North Lindale Reliever Route EIS Corridor Study, Bucher, Willis & Ratliff Corporation. 2007.

The alternative corridors are discussed individually below. The discussion highlights impact characteristics of each corridor or group of corridors that tend to differentiate them from the others. The descriptions are based primarily on the data collected for the 2007 Corridor Study, with updates on residential impacts developed from the more recent Smith County (2010) subdivision data, illustrated in **Figure 4**. Note that for most of the corridors, a substantially larger number of affected residential structures were identified from the 2010 data than were identified in the data collected for the 2007 corridor report. This reflects increased subdivision activity in recent years, particularly in the area nearest to Lindale.

- Corridor A

Corridors A and B are the shortest in length, at 5.2 miles. Of all the corridors studied, Corridor A includes the highest acreage of waters of the U.S./wetlands and the greatest length of streams – 48.51 acres and 9,343 linear feet, respectively. Although it avoids direct impacts to five subdivisions on the west side of Lindale, Corridor A would pass between these residential areas and Lindale, effectively cutting them off from access to the urban center, except via FM 16 or IH 20. It would directly intersect the eastern part of the Stevenson Creek subdivision to the north of FM 16. The 2010 aerial photography and subdivision data shown on **Figure 4** indicates Corridor A would directly or indirectly affect about 97 residential or commercial structures (20 of them inside platted subdivisions).

- Corridor B

Corridor B is also 5.2 miles long, with the lowest project construction and right-of-way cost ($90.8 million) and the second highest potential effect on waters of the U.S./wetlands, at 38.3 acres. Corridor B would directly intersect the Eaglewood, Creekside Mobile Home Park, Wendell Place, Pecan Hills Estates, Shady Lane, Stevenson Creek Estates, and Chris Banks subdivisions west and north of Lindale,

dividing these communities and cutting off existing access to Lindale. The updated subdivision data indicate Corridor B would directly or indirectly affect about 179 residential or commercial structures (99 inside platted subdivisions).

- Corridor C

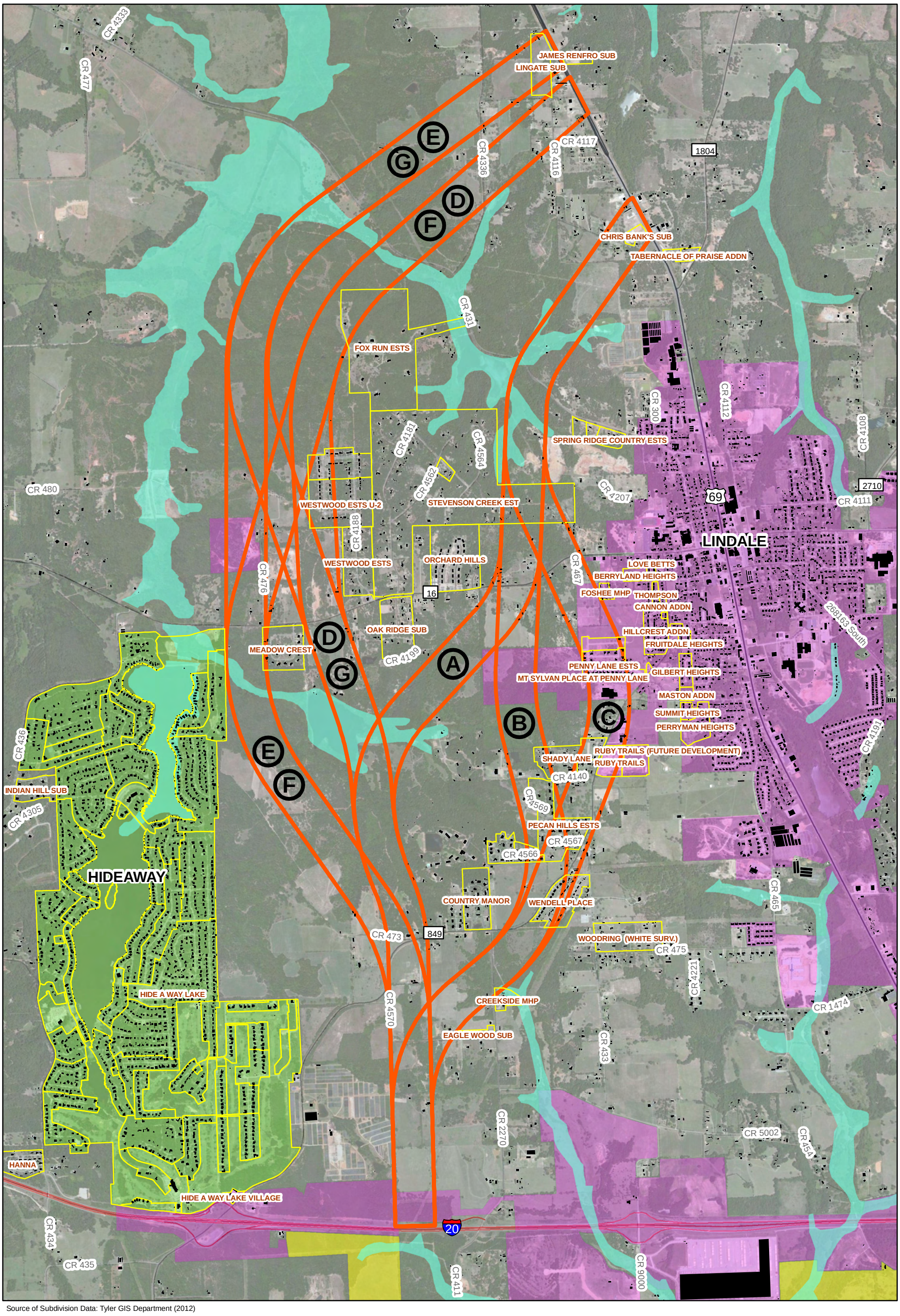
Corridor C is 5.3 miles long and would have the greatest residential development impacts of the seven corridors. Passing the closest to Lindale, it would intersect the seven subdivisions affected by Corridor B, plus the Penny Lane Estates and planned Ruby Trails subdivisions. Corridor C would also intersect the Velma Penny Elementary School, St. Luke's Episcopal School, Holy Family Catholic Church, and a cemetery and could potentially affect about 274 residential or commercial structures (138 inside platted subdivisions). Corridor C would affect the highest number of sensitive receivers to both noise and light pollution.

- Corridor D

Corridor D is 5.9 miles long and would have the most potential effect on riparian forest habitat (same as Corridor F – 4.02 acres). The other corridors did not affect riparian forests. Relative to the corridors to the east, Corridor D has fewer residential development impacts, although it would intersect the Westwood Estates and Fox Run subdivisions, affecting approximately 106 residential and commercial structures (34 inside platted subdivisions).

- Corridor E

The longest of the corridors studied, at 6.5 miles, Corridor E would affect the Meadow Crest and Lingate platted subdivisions, but would affect only about two residential structures in those developments. Corridor E, along with Corridors F and G, have the advantage of lying to the west of most of the Lindale suburban subdivisions, avoiding the adverse impacts of either dividing or cutting off access to these residential areas. Recent aerial photography indicates that about 47 total residential and commercial structures would be affected by Corridor E (six inside platted subdivisions). Corridor E would affect the lowest number of sensitive receivers for both noise and light of the seven corridors. Corridors E and F, which pass the closest to the Hideaway community, were the subject of vocal opposition from Hideaway residents, who presented a petition at the second public scoping meeting. Corridor E would also pass near the closed Lindale landfill, with potentially substantial hazardous waste remediation costs. This corridor would also have the highest estimated construction and right-of-way costs of the seven corridor options.



Source of Subdivision Data: Tyler GIS Department (2012)

N

0 1,125 2,250

Feet

Figure 4
Preliminary Corridors and
Lindale Area Subdivisions

Key to Features

- Preliminary Corridors
- Project Area Subdivisions
- Structures
- City of Tyler 5-Mile ETJ
- Hideaway Corporate Boundaries
- Lindale Corporate Boundaries
- 100-Yr Floodplains

- Corridor F

Corridor F is 6.4 miles in length. Corridors F and G were added to the corridor evaluation study during the scoping process to allow consideration of combinations of Corridors D and E. Corridor F follows Corridor E south of FM 16 and then crosses over to Corridor D north of FM 16. Corridor F thus retains the encroachment effect on Hideaway, which was the basis of that community's objections. The Corridor alignment tries to minimize impacts to the closed landfill north of FM 16, but does not avoid it altogether. At and north of FM 16, Corridor F would affect the Meadow Crest and Fox Run subdivisions, which recent aerial photography indicates contain only about four residential structures. However, north of FM 16, Corridor F follows Corridor D through a more densely developed area near the US 69 intersection, resulting in total potential effects on about 80 apparent residential and commercial structures.

- Corridor G

At 6.2 miles in length, Corridor G combines the characteristics of Corridor D south of FM 16 and Corridor E north of FM 16. The result is a corridor that avoids the encroachment on the Hideaway community south of FM 16, doesn't partition or cut off access to the actively developing residential area west of Lindale, and avoids contact with the closed landfill and the abandoned dump site north of FM 16. Near the north intersection with US 69, Corridor G intersects the Lingate subdivision, which contains four apparent structures. Altogether, Corridor G would affect about 47 apparent commercial or residential structures, the fewest of any of the corridor options. Corridor G would affect the second fewest number of noise- or light-sensitive receivers. It would have the highest earthwork requirements of the corridors, at 1.04 million CY/mile, but has only the third highest construction and right-of-way costs of the seven corridors.

II.C.3 Summary of Results of the Scoping Process Corridor Screening

The project scoping process concluded with the meeting of the joint lead and participating agencies held on November 27, 2007, at which the findings of the Corridor Study were presented, included the following:

> "Description of the proposed project: …Three alternatives are currently being considered for the proposed project: Alternative D, Alternative G, and the No Build Alternative. The southern terminus is the same for both Alternatives D and G, but the northern termini differ slightly. Alternative D would connect to US 69 south of Alternative G…"

Based on objective criteria and substantive and documented environmental and socioeconomic data, the analysis determined that Corridors A, B, and C had the three highest right-of-way and utility adjustment costs, the three highest number of residential improvement impacts, the three

highest number of noise and light pollution receivers as well as the three highest number of wetland acreage impacts as compared to the other corridors. Corridors A, B, and C were also located closer to Lindale and divided the partially developed Lindale suburban community to a greater degree when compared to the other corridors. Corridors A, B, and C would have less fragmentation effects on wildlife habitat than the less developed western corridors. Taking these factors into consideration, Corridor A, B, and C were not recommended for further study.

Corridors E and F had the longest project length and the highest project construction cost as compared to the other corridors. Corridors E and F also represented the only two corridors that disturbed the Old Lindale Landfill and adjacent southern landfill which would require substantial site remediation efforts and costs as well as design constraints for the project. The City of Hideaway strongly supported removing Corridor E and F from further study as evidenced in their resolution dated June 11, 2007. Taking these factors into consideration, these corridors were not recommended for further study.

Corridors D and G appeared to have a moderate project length, right-of-way cost, and project construction cost when compared to the other preliminary corridors. Corridors D and G had lower numbers of potential residential impacts than Corridors A-C, and appeared to strike a reasonable balance between cost, engineering, safety, social, and natural environment impacts. As the middle group of corridors, Corridors D and G maximize the buffer distance from both Lindale to the east and Hideaway to the west, thus optimizing the objective of consistency with community goals and development trends. The public involvement record indicates that the project was initially controversial due to the westernmost alternatives (Corridors E and F) being opposed by city of Hideaway residents and the easternmost alternatives (Corridors A, B and C) being opposed by some Lindale residents and the Timberline Baptist Encampment. The decision to refine the evaluation to Alternatives D and G minimized this opposition. These corridors do not appear to have any fatal flaws or apparently substantial adverse impacts when compared to the other corridor alternatives. These findings were presented to the participating agencies and the public at the third scoping meeting held on November 27, 2007. The comments received at this meeting came from members of the public and were related to support for one alternative corridor or another, as opposed to the range of alternatives itself or the evaluation criteria; no comments from participating agencies were received. No objections or other comments were presented by City of Hideaway representatives. Corridors D and G were therefore incorporated into the Final Coordination Plan as reasonable alternatives for further study in the DEIS.

II.C.4. Value Engineering Study

A Value Engineering Study is required by the FHWA under 23 CFR Part 627 for all transportation corridors or federal-aid projects with an estimated cost of $25 million dollars or more. There is no exception to this requirement. A Value Engineering Study was sponsored by

the Tyler District January 22–26, 2008. This study involved an outside facilitator, TxDOT representatives from Austin Headquarters, the Tyler District and the Mineola Area office, and engineering and environmental representatives from the consulting team. The five-step Value Engineering process involved investigative, speculative, evaluation, selection and presentation phases where all aspects of the No Build Alternative and the reasonable alternatives were scrutinized to identify any potential cost reductions. Among other modifications, Value Engineering recommended phasing the proposed ultimate four-lane project design project by constructing an interim two-lane phase, then completing the ultimate four-lane facility at a later date. The resulting project cost reductions were substantial, with the two-lane interim phase project resulting in a cost reduction of approximately 30 percent. Resulting cost reductions were primarily realized through eliminating and/or reducing the length of bridges and providing a more efficient earthwork plan. The DEIS Project Manager and Tyler District environmental staff participated in the Value Engineering process and confirmed that the recommended design and earthwork modifications represented a reasonable balance of economic value and environmental protection.

II.D. Description of Reasonable Alternative Alignments and No Build Alternative

The Corridor Study Report evaluation resulted in the identification of two reasonable alternative alignments for detailed examination in the DEIS: Alternative Alignments D and G (see **Figure 5**). These results were presented to the participating agencies and the public at the third scoping meeting on November 27, 2007. As **Table 4** indicates, this meeting marked the conclusion of the scoping process and initiation of the detailed impact assessment of the reasonable alternatives for the DEIS. Alternatives D and G were determined to best minimize impacts on both the human and natural environments while moderating costs. They have identical design and tolling criteria but traverse different routes and terminate at US 69 north of Lindale approximately one-half mile apart. Alternatives D and G also have similar right-of-way widths, based upon the design requirements of each alternative. Originally, construction costs for Alternatives D and G were estimated at $94.3 million and $98.5 million, respectively. According to the 2013–2016 STIP, though, the construction cost for the proposed project is estimated at $62,954,128 (with a total project cost for the interim facility estimated at $82,268,454). These alternatives, along with the No Build Alternative, are discussed in more detail below.

II.D.1. Alternative D

Moving from south to north, Alternative D begins at the intersection of Loop 49 West and IH 20 and extends north, crossing FM 849 immediately west of the intersection of FM 849 and CR 472. It continues north, crossing FM 16 West at a point approximately 0.30 mile east of the

intersection of FM 16 and CR 476. It then continues north and northwest, crossing CR 431 at a point approximately 0.33 mile northwest of the intersection of CR 431 and CR 4118. From this point, the alternative extends northeast, crossing CR 4118 at a point approximately 0.39 mile south of the intersection of CR 4118 and CR 4116 and continuing northeast to connect to US 69 at a point approximately 0.26 mile north of the intersection of US 69 and CR 4117.

The length of Alternative D is approximately 7.0 miles, and approximately 423.15 acres of right-of-way would be required for construction of this alternative.

Construction of Alternative D would impact three county roads at its north end, requiring the realignment of CR 4148, the partial closure of CR 4116, and the extension of CR 4117 at US 69. Near the south project limit, CR 473 would be realigned for both alternatives with a partial closure across the proposed US 69/Loop 49. Construction costs for these county road modifications are built in to the total construction cost estimate for this alternative. There would be some minor effects on local travel patterns and access in the vicinity of these modifications, as described in more detail in **Section IV.B.2.b Mobility and Access Impacts**.

II.D.2. Alternative G

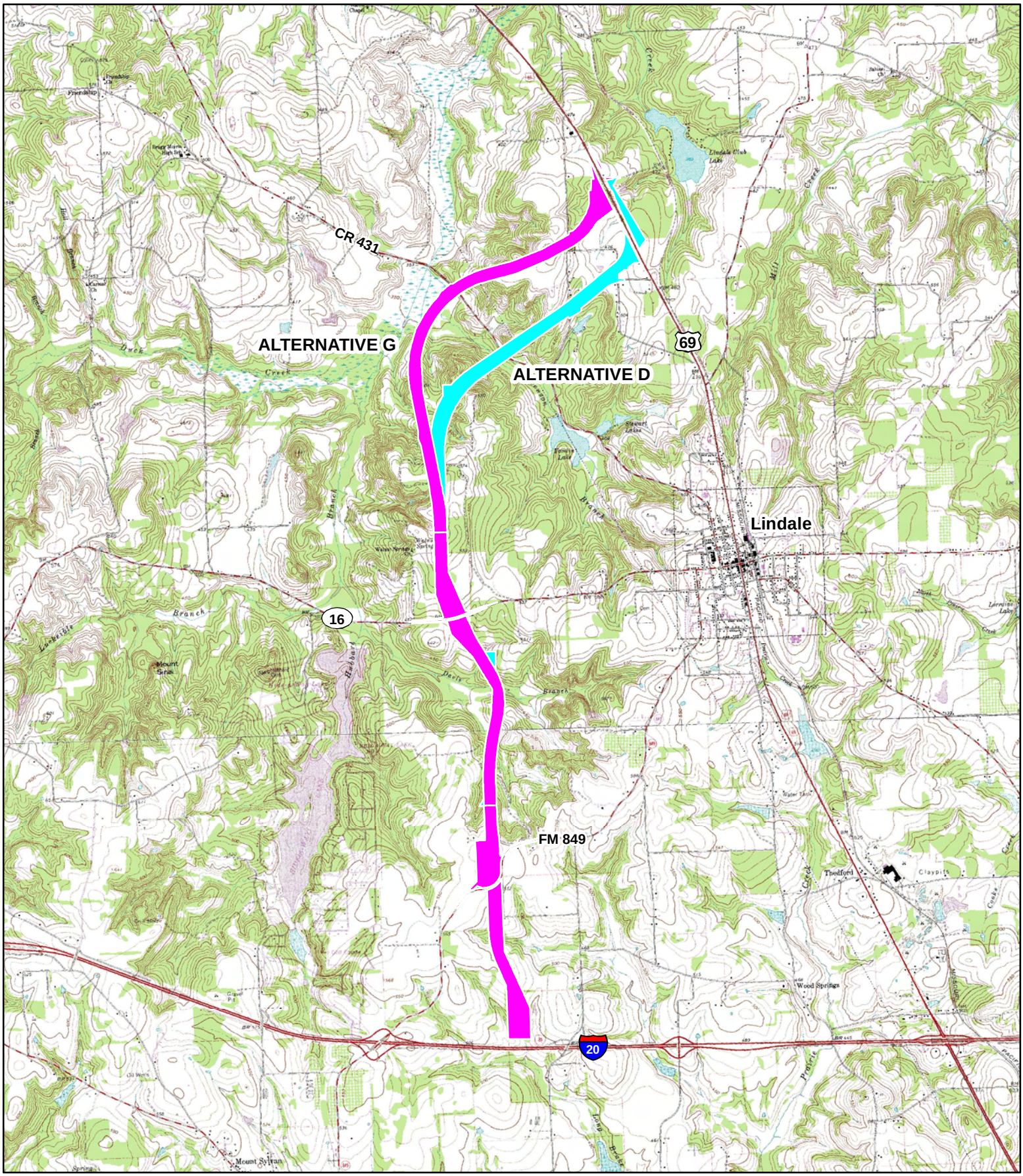
Alternative G shares the same southern terminus as Alternative D, and is the same up to the crossing of FM 16 West, at which point the two alternatives begin to diverge. From FM 16 West, Alternative G continues north, northwest, and northeast, crossing CR 431 at a point approximately 0.87 mile northwest of the intersection of CR 431 and CR 4118. From this point, the alternative extends northeast, crossing CR 4118 at a point approximately 0.06 mile (320 feet) north of the intersection of CR 4118 and CR 4116 and continuing northeast to connect to US 69 at a point approximately 0.49 mile south of the intersection of US 69 and CR 4118.

The length of Alternative G is approximately 7.4 miles, and approximately 427.5 acres of right-of-way would be required for construction of this alternative.

Other than a minor realignment and partial closure of CR 473 near its south project limit, construction of Alternative G would not require the realignment, closure, or extension of any county roads.

II.D.3. No Build Alternative

The No Build Alternative would leave the current transportation network to handle future demand. Since this alternative involves no construction activities, the direct environmental impacts associated with the Build Alternatives would not occur. An economic effect of the No Build Alternative would be a savings of approximately $63.0 million in construction funding



N

0 2,250 4,500

Feet

One Inch Equals 4500 Feet

Figure 5

Reasonable Alternatives

Key to Features

- Alternative D
- Alternative G

required for the proposed project. On the other hand, the local, regional and state economies would not benefit from construction phase employment and would not realize the estimated $112,738,252 in direct, indirect, and induced income from project construction (based on the US Bureau of Economic Analysis' RIMS II Multipliers, described in **Section IV.B.1**). The No Build Alternative would also preclude the expected positive aspects of the reliever route project. It would not provide mobility and access improvements for the region, particularly for those residents living or working in the vicinity of the proposed facility. It would not provide a relief route for Lindale, which has been requested by the traveling public and local planning authorities. The No Build Alternative would not alleviate the traffic increases on the existing transportation network, especially US 69 and other arterials and county roads.

The No Build Alternative also implies that when traffic congestion and mobility requirements are eventually addressed, through future upgrades to US 69 or construction of a reliever route (or both), they would be accomplished at much higher cost and greater disruption to business and residential development that is likely to occur in the project area. The deteriorating level of service predicted by the feasibility study would create an increased potential for traffic delays, hazards and accidents, and a possible decrease in the quality of life in the city of Lindale. The No Build Alternative is not consistent with local transportation plans or the current MTP.

II.D.4. Comparison of Effects of Build Alternative Alignments

Table 7 provides a comparison of selected impacts for the build alternatives described above. More detailed analysis of potential impacts of the alternative alignments is presented in **Chapter III, Environmental Consequences**. Note that the information on the alternative alignments in **Table 7** is not intended to exactly match the information on the preliminary corridors presented in **Table 6** because: (1) the preliminary corridors were 1,000 feet wide, compared with the usual minimum 450 foot-wide alignments; (2) minor shifts in the alignments were made to minimize impacts during the schematic design process.

Table 7 Comparison of Selected Impacts – Build Alternatives

	Alternative D	Alternative G
Length (miles)	7.0	7.4
Right-of-way Required (acres)	423.15	425.5
Residential Relocations (#)	18	10
Commercial Displacements (#)	6	1
Oil/Gas Facility Relocations	0	0
Residential Land Use (acres)	20.27	10.82
Commercial Land Use (acres)	25.97	21.42
Community Facilities (acres)	19.23	18.11
Other Land Uses (acres)	0	0
Grassland Impacts (acres)	166.32	197.92
Forest Impacts (acres)	206.85	196.63
Potential Wetland Impacts (#)	4	5
Waters of the U.S./Stream Impacts (#)	7	8

Table 7 Comparison of Selected Impacts – Build Alternatives (continued)		
	Alternative D	**Alternative G**
Floodplain Impacts (acres)	6.17	23.64
Construction Costs (millions)*	$63.0	$63.0

*These construction costs are based upon the 2013–2016 STIP estimate for the interim phase, which is not distinguished by alternative. Preliminary engineering evaluations adjusted by the Value Engineering study were $72.7 million for Alternative D and $71.6 million for Alternative G.

II.E. Technically Preferred Alternative

II.E.1. Process for Identification of Technically Preferred Alternative

A technically preferred alternative was identified by comparing the various project alternatives with regard to engineering, cost, traffic, and environmental impacts. Both Alternatives D and G were found to meet the project's Need and Purpose as defined in the project Coordination Plan and **Section I.B**. **Chapter IV** of this DEIS provides a detailed quantitative comparison of the environmental impacts of the alternatives which are summarized in **Table 7**. Identification of the technically preferred alternative was based on this environmental comparison and the public and agency involvement processes described in **Section I.C**.

Modifications to some aspects of the reasonable alternatives were made in the Value Engineering Study, which is required by the FHWA under 23 CFR Part 627 for all transportation corridors or federal-aid projects with an estimated cost of $25 million or more. There is no exception to this requirement. A Value Engineering Study for the proposed Lindale Relief Route was completed on January 25, 2008. In addition to the No Build alternative, the study examined the routes for the two primary build alternatives, Alternatives D and G, taking into consideration a number of factors, including interchanges, floodplains, wetlands and water crossings, right-of-way acquisition, relocations and displacements, functional requirements of the project, earthwork (cut and fill balance), other engineering constraints, and environmental impacts.

The Value Engineering Study also resulted in slight adjustments being made to the vertical alignment and length of bridges for Alternative D. These changes resulted in a reduced estimated cost of construction for Alternative D. Alternative D would cost approximately $72,684,000 for the ultimate four-lane facility, with an estimated $46,172,000 of this amount needed for construction of the two-lane interim facility. This represents a 22.9 percent savings from the original estimate of $94.3 million. The original cost estimate was preliminary; the 2013–2016 STIP now lists the estimated construction cost for the interim phase of the proposed project as $63.0 million, with the total project cost estimated to be $82.3 million.

As a result of the Value Engineering Study, slight adjustments were also made to the vertical alignment and length of bridges for Alternative G. These changes resulted in a reduced estimated cost for construction of the proposed project. Alternative G would cost approximately

$71,622,000 to construct the ultimate four-lane facility, with an estimated $45,983,000 of this amount needed for construction of the two-lane interim facility. This represents a 27.3 percent savings from the original estimate of $98.5 million. The original cost estimate was preliminary; the 2013–2016 STIP now lists the estimated construction cost for the proposed project as $63.0 million, with the total project cost estimated to be $82.3 million. This cost would have been substantially higher for both alternatives had the adjustments resulting from the Value Engineering Study not been used.

Based on the comparison of the positive and negative aspects of the alternatives, Alternative G presented the optimal value for serving the local community and improving the regional transportation system.

II.E.2. Description of the Technically Preferred Alternative

The technically preferred alignment alternative is Alternative G, as described in **Section II.D.2**.

This project would be designed using the design standards specified in the TxDOT Roadway Design Manual. These standards are a general goal, for which exceptions may be approved to avoid or accommodate protected resources, private property issues, and other factors.

The proposed action described in this DEIS document is the construction of a new location full control access relief route for US 69 through the city of Lindale in Smith County, Texas. The proposed reliever route facility would be designated as US 69/Loop 49 North (CSJ 0190-04-033), and would connect to the terminus of Loop 49 West (completed in March 2013), which is northwest of the city of Tyler. The proposed Lindale Reliever Route would begin at the intersection of IH 20 and Loop 49 West (see **Figure 5**). The ultimate configuration for this interchange is a four-legged, three-level diamond interchange with the main lanes of the interstate at the base level, the IH 20 access roads and loop ramps at the second or middle level, and the loop mainlanes at the third or highest level. The proposed reliever route facility would then extend north for approximately 7.4 miles, terminating at US 69, north of the city of Lindale and south of Duck Creek. **Figure 2** illustrates how the proposed roadway would be integrated as part of the State Loop 49 system; this is also discussed in **Section I.D.1**.

The Lindale Reliever Route is designed to be a high speed, controlled access toll road. The toll policy does not currently provide for discounts for transit vehicles or motorcycles. As the interim phase of the proposed project would be comprised of one lane in either direction, there would not be a high occupancy vehicle (HOV) lane. The requirements for a freeway section in TxDOT's Roadway Design Manual would be met by the proposed design. The design speeds would be 70 miles per hour for mainlanes, 50 miles per hour for connecting ramps to crossing streets, and 30 miles per hour for local crossing roadways in need of construction or

reconstruction. Where crossing roadways have higher functional classification, the minimum design speed and design standards would meet or exceed the requirements of the TxDOT Roadway Design Manual. **Tables 8** and **9** list the current recommended design standards for the Lindale Reliever Route project.

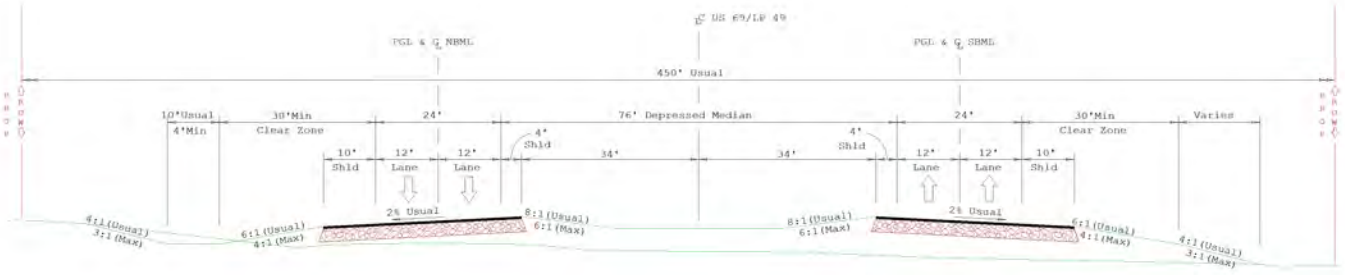
Table 8 Design Standards for the Mainlanes

Design Element		Desirable	Minimum	Roadway Feature		Dimension
Design Speed		70 mph	70 mph	Thru Lane Width		12 feet
Maximum Horizontal Curvature		3,405 feet R	2,050 feet R	Bridge Width		38 feet (one way)
Maximum Super elevation Rate		6.0%	6.0%	Shoulder	Inside	4 feet
					Outside	10 feet
K value	sag vertical curve	220	181	Median Width (Depressed)		76 feet
	crest vertical curve	540	247			
Maximum Grade		4.0%	4.0%	Cross Slope	Thru Lane	2%
					Shoulder	2%
Minimum Grade		0.50%	0.25%	Structure Clearance	Horizontal	30 feet (minimum)
					Vertical	16 feet 6 inches (minimum)

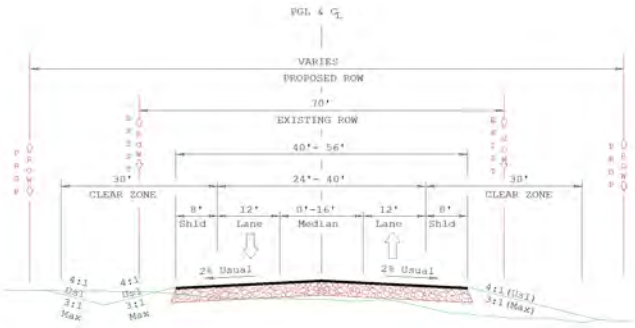
Table 9 Design Standards for Ramps and Crossroads

Design Element	Ramp	Crossroads
Design Speed	50 mph	30 mph minimum or as per Design Manual
Maximum Horizontal Curvature	835 feet R	275 feet R or as per Design Manual
Maximum Grade	5% (steeper grades may be allowed for unusual conditions)	10% or as per Design Manual
Minimum Grade	0.50%	0.50%
Proposed Number of Lanes	1 Lane / 2 Lanes	2
Lane Width	14 feet / 12 feet	10 feet or as per Design Manual
Inside Shoulder	2 feet / 4 feet	N/A
Outside Shoulder	6 feet / 8 feet	2 feet or as per Design Manual

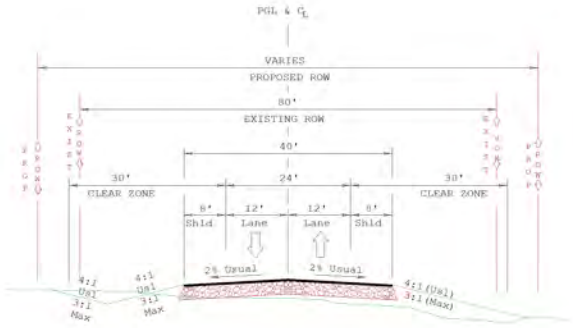
The proposed right-of-way would be approximately 450 feet wide (in order to accommodate extensive earthwork needed for the facility) (see **Figures 6a-c**), including a 76-foot wide depressed median. Approximately 427.5 acres of new right-of-way would be required for the proposed project. The ultimate facility would consist of four 12-foot main lanes with four-foot inside and 10-foot outside shoulders; however, an interim facility would have two main lanes. The remaining two lanes of the ultimate four lane divided facility would be constructed when funding becomes available. The two lane interim facility would provide an alternative for through traffic on US 69 to exit and avoid downtown Lindale, an alternative that is currently unavailable. This would help to alleviate congestion in Lindale and provide through traffic with a safe, higher speed option to connect to the Loop 49 system. Entrance and exit ramps would



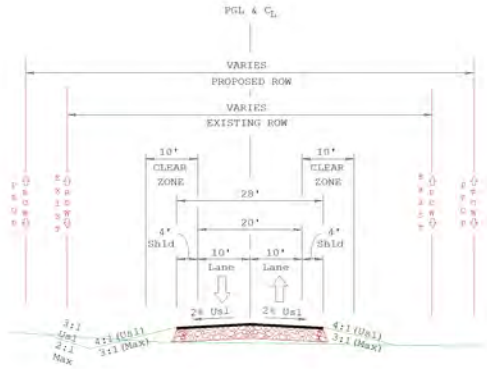
US 69 / LP 49 MAINLANES



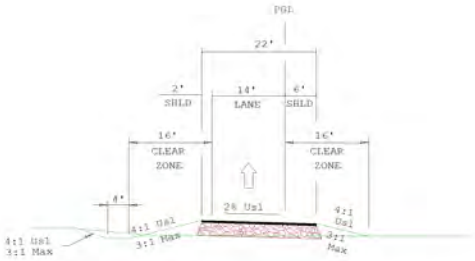
FM 16



FM 849



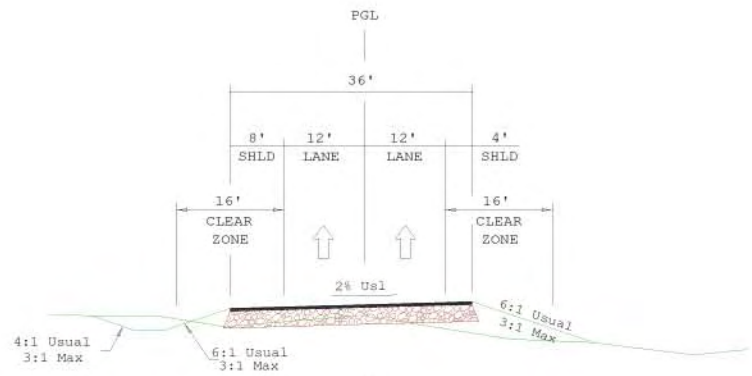
CO. & ACCESS ROADS



ONE LANE
ENTRANCE / EXIT RAMPS

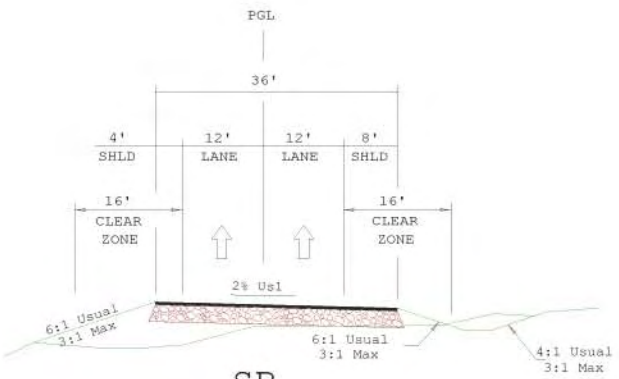
TYPICAL SECTION
HORIZONTAL SCALE

US 69 Lindale Relief Route
Typical Sections - Figure 6a



NB

TWO LANE
ENTRANCE / EXIT RAMPS
(I-20)

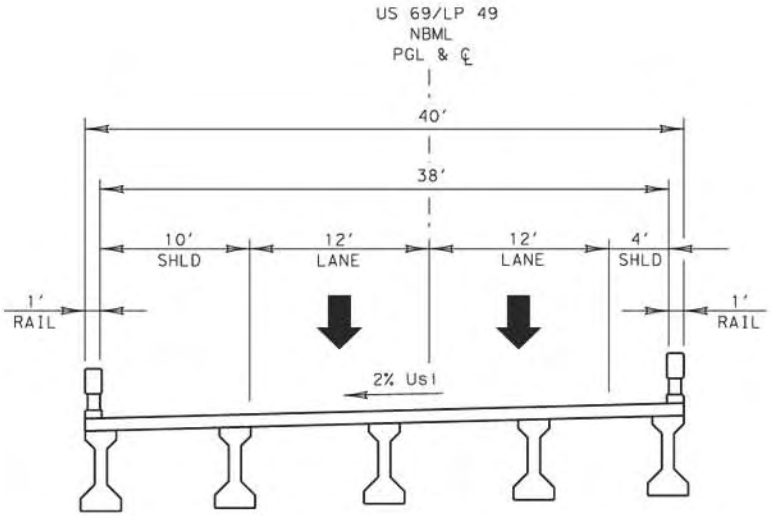


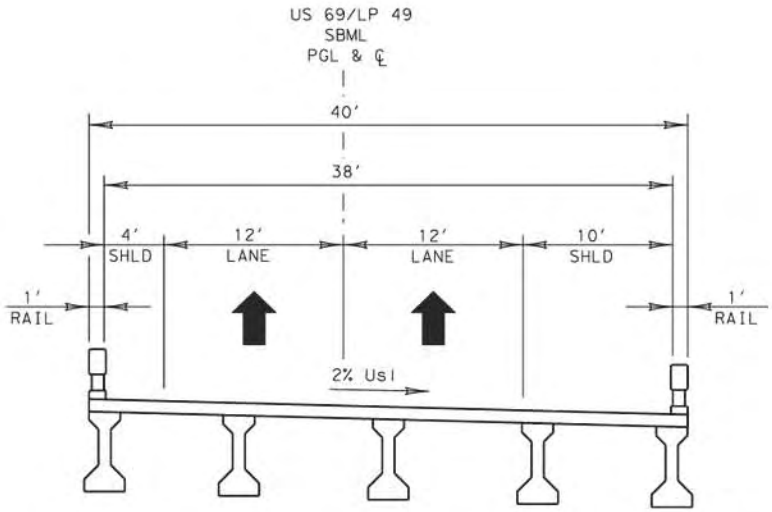
SB

TWO LANE
ENTRANCE / EXIT RAMPS
(I-20)

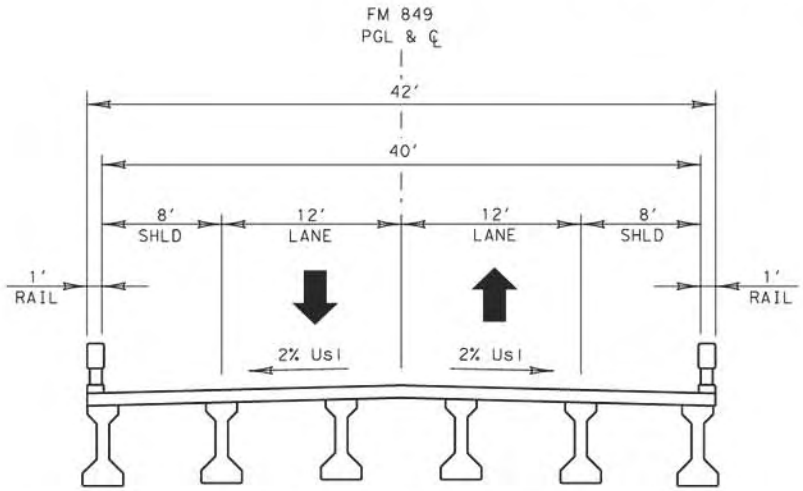
SCALE

US 69 Lindale Relief Route
Typical Sections - Figure 6b

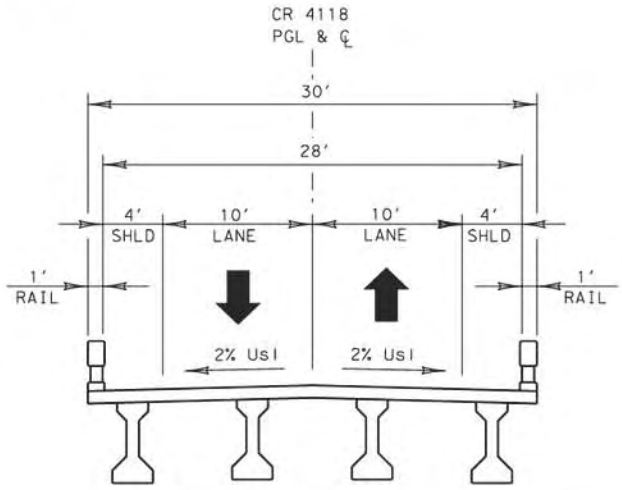




US 69/LP 49 MAINLANE BRIDGE OVERPASS @
CR 4118 (ALT D), CR 431, STEVENSON BRANCH, ACCESS RD (ALT D)
FM 16, DAVIS BRANCH, DAVIS BRANCH TRIBUTARY & IH 20



FM 849 BRIDGE OVERPASS



CR 4118 BRIDGE OVERPASS (ALT G)

US 69 Lindale Relief Route
Typical Sections - Figure 6c

typically consist of a 14-foot lane with two-foot inside and six-foot outside shoulders. At the IH 20 intersection, entrance and exit ramps would consist of two 12-foot lanes with four-foot inside and eight-foot outside shoulders.

A diamond interchange would be constructed at FM 16. Twin grade-separation bridges over FM 16 with a 40-foot width would be built for the southbound and northbound roadways on US 69/Loop 49 North. FM 16 would be realigned and widened to 56 feet and would consist of one 12-foot eastbound lane and one 12-foot westbound lane with eight-foot outside shoulders and a 16-foot wide flush median. The 16-foot wide median would also function as a left turn lane.

A grade separation at County Road (CR) 431 would consist of twin mainlane bridges, each 40 feet wide overall. Each bridge would consist of two 12-foot lanes with a four-foot inside shoulder and a 10-foot outside shoulder.

Continuous access roads are not planned. Some access roads meeting the requirements of the TxDOT Roadway Design Manual may be constructed, where economically justified, to provide access to land-locked parcels or severed county roads. Roads for driveway access to otherwise landlocked parcels would be two-way and would consist of one 10-foot inbound and one 10-foot outbound lane. Roads for county road access would be designed to meet design standards for crossroads as shown in **Table 9**.

Bridge overpasses would be constructed at the intersections with CR 4118 and FM 849, with the reliever crossing underneath the intersecting roads. The FM 849 bridge would be 42 feet wide overall and would consist of one 12-foot westbound lane and one 12-foot eastbound lane with eight-foot outside shoulders and no median. The CR 4118 bridge would be 28 feet wide overall and would consist of one 10-foot northbound lane and one 10-foot southbound lane with four-foot outside shoulders and no median. No access roads would be constructed at these intersections.

The Lindale Reliever Route would be anticipated to be constructed in phases. The interim phase would include constructing grade-separation structures and interchanges to provide non-stop through movement of traffic with ramps and connecting roadways to enter or exit the mainlanes of the facility. Two lanes of the ultimate four lanes would be constructed initially. For mobility purposes, construction of passing lanes along a portion of the project would be implemented and design standards met for a two-lane roadway. For the interim phase of construction, some of the ramps or direct connectors would be omitted but added in a later construction phase as economically justified. For similar reasons, the Lindale Reliever Route mainlanes at the IH 20 interchange that make up the top level of the planned three level diamond interchange may be constructed within a later construction phase. Ramps, direct connectors, and mainlane segments omitted in the interim phase of construction would be added as warranted and as funding allows.

1

III. Affected Environment

The environmental setting of the Lindale Reliever Route project area (**Figure 1**) is discussed from a regional perspective, supplemented with project-specific information where appropriate. Baseline information is provided for existing land uses, social and economic conditions, ambient noise, geology and soils, air quality, water resources, ecological resources, wetlands, threatened/endangered species, floodplains, cultural resources, visual resources, and hazardous materials. This section is the basis for determining potential project impacts, as discussed in **Section IV**. Potential environmental constraints are depicted on **Potential Environmental Constraints Plates 1-7** in **Appendix A**.

III.A. Land Use

III.A.1. Historical Development Patterns

Originally part of the Thomas Burbridge survey, Lindale was settled as early as 1873, when the Lindale post office opened. The next year the spelling was changed to Lindale, and in 1875 the settlement became a station on the new International-Great Northern Railroad line. On November 1, 1898, the Lindale City school system was established. Two years later, fruit and truck farming had become the major sources of income. In 1902 the population reached 1,200, making Lindale the third largest city in Smith County. In 1905 the town was incorporated. The community developed restaurants, millinery and notions stores, two banks, and the Brazelton Prior Lumber Company. The second hard-surface road in the county, the Jim Hogg Highway, was constructed from Tyler to Lindale by 1921 (McCrosky, 2013a).

During the mid-1950s, Lindale garnered the reputation as the blackberry capital of the world, with tons of berries canned and shipped each year. In the late 1960s, Hideaway Lake, a private retirement community, was developed around three small man-made lakes outside of Lindale. In 2000, Hideaway Homeowners Inc., and Hideaway Lake Club, Inc., merged and incorporated into the City of Hideaway (McCrosky, 2013a). It is home to nearly 3,000 residents, not all of them retirees. The City of Hideaway has its own golf course, community lodge, newspaper, security patrols and other amenities (Hall, 1996).

Lindale continued to grow, particularly in the 1970s, because of its proximity to Tyler and IH 20, the fertility of the soil for agriculture, and the well-regarded school district. In 1990 the population was 2,428. By 2000 the population was 2,954 with 398 businesses (McCrosky, 2013a). According to 2010 Census data, Lindale's population was 3,051 persons in 2010. Though Lindale's fruit and vegetable market has declined over the past few decades, it has been replaced by cattle, hay production and roses (Hall, 1996).

III.A.2. Existing Land Uses

III.A.2.a. Land Use/Land Cover in the Region

The Natural Resources Conservation Service (NRCS) calculates the acreage of various types of land cover by county in the Natural Resources Inventory (NRI). **Table 10** summarizes the estimated acreage by land cover for Smith County for 1992 and 1997, the most recent years for which this data is available. The land cover in Smith County is predominantly forest land and pastureland. Between 1992 and 1997, there was a 38-percent decrease in cultivated cropland and a nine-percent increase in urban land uses. Other land uses changed little. There is no rangeland, federal land, or Conservation Reserve Program land in Smith County.

Table 10 Land Cover in Smith County, 1992 and 1997 (in 1,000 acres)

Land Cover	1992	1997	% Change 1992-1997
Cropland-cultivated	22.6	14.1	-37.6%
Cropland-noncultivated	9.4	9.5	1.1%
Pastureland	203.5	194.8	-4.3%
Rangeland	0.0	0.0	0.0%
Forest land	252.3	261.8	3.8%
Minor land cover/uses	10.6	10.9	2.8%
Urban-small and large built-up	81.7	88.9	8.8%
Rural transportation-roads and railroads	7.7	7.8	1.3%
Water-small-streams < 660 feet wide and water bodies < 40 acres	8.6	8.6	0.0%
Water-census-streams >= 660 feet wide and water bodies >= 40 acres	11.4	11.4	0.0%
Federal land-cover/use not recorded	0.0	0.0	0.0%
Conservation Reserve Program	0.0	0.0	0.0%
Total	607.8	607.8	0.0%
Total error	97.3	97.3	0.0%

Source: Natural Resources Conservation Service (NRCS), Natural Resources Inventory (NRI), 1992 and 1997.

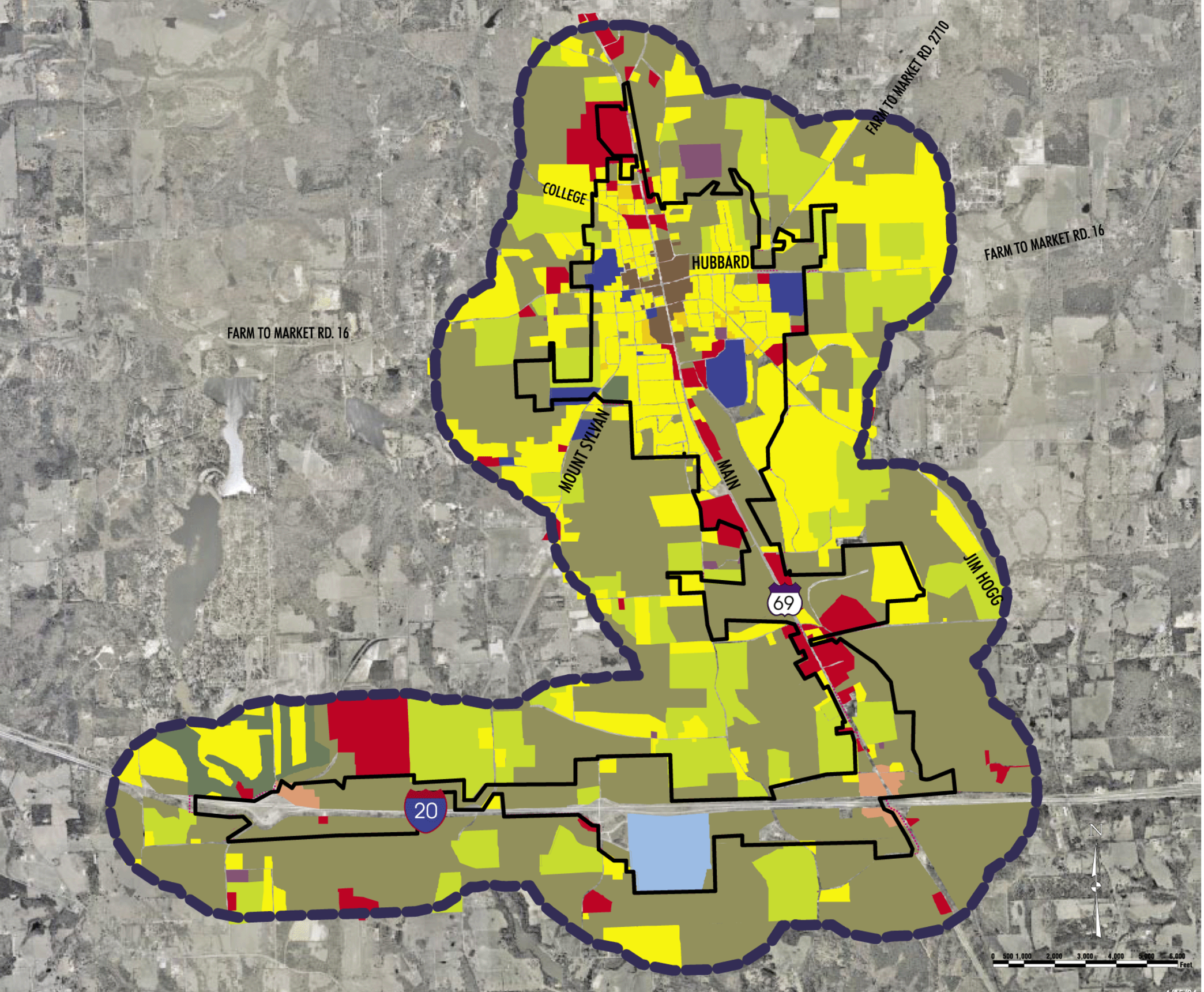
In 2004, the existing land uses in the city of Lindale were surveyed (City of Lindale, 2004). The incorporated area includes approximately 3,006 acres, of which approximately 1,081 acres (36 percent) were undeveloped (see **Figure 7**). The second largest land use category was residential, comprising 678 acres (22.6 percent). Single-family residential use comprised 652.5 acres and multi-family residential use was only 25.5 acres (21.7 and 0.8 percent of the incorporated area, respectively). Commercial uses included 363.2 acres, or 12.1 percent. Farmstead use included 153.0 acres (5.1 percent) and transportation/distribution comprised 145.7 acres (4.8 percent). The Target Distribution Center dominates the transportation/distribution category. The facility was constructed in 1998 on IH 20 near the project's southern terminus and employs approximately 725 persons. Recreation, public, and institutional land uses comprise the remainder of the incorporated area.

The City of Lindale's extra-territorial jurisdiction (ETJ) is one-half mile outside its corporate boundaries and includes a total of 8,203 acres. In 2004, approximately half of the land in the ETJ (4,081 acres, or 49.8 percent) was undeveloped. Approximately 1,593 acres (19.4 percent)

LINDALE SECOND CENTURY COMPREHENSIVE PLAN

EXISTING LAND USE

Figure 7



Source: RM Plan Group , GS&P - 2004

Legend

- Lindale City Limits
- Lindale ETJ / Planning Area

Land Use Categories

- Single-Family
- Multi-Family
- Mixed Use
- Thoroughfare Commercial
- Convenience Commercial
- Transportation/Distribution
- School
- Worship
- Public
- Recreational
- Undeveloped

NOTE: THE INFORMATION SHOWN HEREIN HAS BEEN PROVIDED BY THE SMITH COUNTY APPRAISAL DISTRICT. THIS MAP WAS PREPARED BY GRESHAM SMITH & PARTNERS FOR ITS USE ONLY. NO WARRANTY, GUARANTEE, OR REPRESENTATION IS MADE BY GRESHAM SMITH & PARTNERS AS TO THE ACCURACY.

was dedicated to residential use (all single-family), while 1,540 acres (18.8 percent) was dedicated to farmsteads (see **Figure 7**). Commercial use comprised 247.5 acres (3 percent), institutional land use (e.g., schools and churches) made up 28.5 acres (0.3 percent), and public use comprised 41.8 acres (0.5 percent). The rest of the land is unaccounted for in the survey. The City of Hideaway's ETJ is also one-half mile and recently increased by approximately 50 acres to the east.

III.A.2.b. Project Area Land Use

The proposed Lindale Reliever Route project corridor is located on the boundary of the Post Oak Savannah and Pineywoods natural regions of Texas (Gould et al., 1960; Gould, 1975) and within the South Central Plains Ecoregion more recently mapped by Griffith et al. (2004) and EPA (see **Section III.G.1**). The portions of the region that have not been cleared for agriculture or urban uses tend to be heavily forested.

The project area is between Lindale and Hideaway; the area is largely rural, with scattered residences and commercial properties. Residential subdivisions, including Fox Run Estates, Stevenson Creek Estates, and Westwood Subdivision, are located in the project area. These subdivisions are all adjacent to one another and are on larger, wooded lots north of FM 16 (see **Potential Environmental Constraints Plates 3-4**)

Where the northern terminus of the project connects to US 69 north of Lindale, there are more residences and some businesses, including Holey Plumbing Company, Hide It Away Storage, R&T Quality Nursery, and Lindale Fertilizer. Three community facilities, Timberline Baptist Camp, Calvary Commission, and Veterans of Foreign Wars (VFW) Post 9828, are found within the project area. Arabella Bed & Breakfast is located near the center of the project area just south of the point where the two build alternatives diverge. Businesses in the southern portion of the project include Trees USA and two sand mining operations. Land uses adjacent to the proposed build alternatives are depicted on **Potential Environmental Constraints Plates 1-7 in Appendix A**. Photos of the project area are found in **Appendix B**.

III.A.3. Agricultural Uses

Agriculture, including forest land, is the largest land use in Smith County. Even though much of the forest land is not actively harvested, timber remains a large potential agricultural commodity. In addition to timber, the agricultural lands of Smith County are devoted to the production of a variety of plants and animals. Smith County is a major producer of rose bushes and other nursery stock. Other important agricultural products include beef cattle, hay, watermelons, fruits, and pecans. Statistics related to agricultural land uses within Smith County are shown in **Table 11**.

The majority of the project area is undeveloped land, some of which is used for agricultural purposes. The primary agricultural use is pastureland for cattle. Prime farmland soils are discussed in **Section IV.D.2**.

Table 11 Agricultural Land Uses in Smith County

Agricultural Land Use	Number of Farms	Acres
Land in agricultural use	2,514	302,359
Average size of farm	---	120
Total cropland	1,687	91,797
Harvested Cropland	1,366	59,561
Irrigated land	168	2,651
Cattle production	1,383	---
Hogs/pigs production	41	---
Sheep production	29	---
Poultry production	210	---
Forage crops (hay, etc.)	1,152	54,752
Orchards	90	1,480

Source: United States Department of Agriculture (USDA), National Agricultural Statistics Service. 2007 Census of Agriculture.

III.A.4. Parks, Public Lands and Facilities, Including Section 4(f) Resources

No parkland, recreational area, wildlife or waterfowl refuge, or National Register of Historic Places (NRHP)-eligible properties would be affected by the proposed project. The Hideaway Golf Course, a private facility, is to the west of the southern terminus, north of IH 20 and west of FM 849. Lindale has two city parks. The City of Lindale's Faulkner Park, currently located north of the city limits, consists of 100 acres and includes soccer, tennis, basketball, volleyball and fishing facilities, playgrounds, a nature trail, covered pavilions and concessions. Lindale's Pool Park, located along FM 849, contains baseball and playground facilities along with a covered pavilion, concessions, and a community center building. The Lindale middle school, high school, and ISD administration campus also have recreational facilities.

III.A.5. Local Plans and Policies

III.A.5.a. 2013–2016 Statewide Transportation Improvement Program

The Tyler Area MPO's TIP was included in the 2013–2016 STIP in August 2012. The STIP (included in **Appendix E**) includes the proposed project (CSJ 0190-04-033) as a two-lane new location controlled access toll road as an extension of Loop 49 (with a four-lane ultimate build-out scenario). The 2013–2016 STIP lists the project construction cost as $62,954,128 for the interim facility, with a total project cost estimate of $82,268,454.

III.A.5.b. 2009–2035 Metropolitan Transportation Plan

The Tyler Area MPO's (2010) current MTP summarizes transportation projects planned through 2035, including this proposed project (see **Appendix E**). It is referenced in MTP 2035 as project ID 6, Loop 49 (Segment 4). The segment is to be constructed in two phases: Phase I is a two-lane roadway, and Phase II is a four-lane divided expressway.

III.A.5.c. Lindale

The City of Lindale's Second Century Comprehensive Plan articulates the community's collective vision for the future and serves as a policy document to help guide decision making processes related to the city's future growth and development (City of Lindale, 2004). The planning area encompasses approximately 17,664 acres and includes the City of Lindale's incorporated area and ETJ, a portion of the City of Tyler and the City of Hideaway's ETJs, and a portion of an unincorporated area in Smith County (see **Figure 7**).

The plan includes this project as a "high priority" project. One of the goals in the Plan is to "re-establish US 69 as Lindale's 'Main Street' and avoid the need to widen US 69 to six travel lanes in the future." An objective in meeting this goal is to "reduce use of US 69 as a regional truck route by encouraging and promoting the construction of Loop Road 49 along the western edge of the study area." Moreover, the Plan states, "construction of a Loop Road 49 reliever route…will play a major role in the city's ability to redefine the US 69/Main Street corridor."

According to the Plan, the area designated as Loop Road 49 Corridor is located along the western perimeter of the planning area (see **Figure 2** for a map of the Loop 49 project location). It is largely defined by the proposed Loop Road 49 and areas adjacent to its eastern edge. The Loop Road 49 Corridor is defined as all single-family uses that involve a density of at least six and no more than 12 units per acre. Convenience commercial use may be included adjacent to the FM 16 interchange. Religious facilities and associated camps may be included along the corridor. Two of the recommendations in the Transportation/Mobility Plan (part of the Comprehensive Plan) include: (1) requesting that TxDOT provide an interchange at the intersection of Loop Road 49 and FM 16; and (2) requesting that TxDOT construct Loop Road 49 in a manner to accommodate the eventual extension of the East/West Connector Boulevard westward to FM 849.

III.B. Socioeconomics

The purpose of the socioeconomic assessment is to evaluate the social and economic characteristics which may be affected by the proposed project. The evaluation emphasizes the neighborhoods, businesses, and community resources in or adjacent to the proposed project area.

III.B.1. Population and Demographics

III.B.1.a. Population Trends and Projections

This section provides an overview of socioeconomic characteristics within the project area. **Table 12** summarizes the population change from 1990 to 2010, and the projected population from 2020 to 2040 in Lindale, Smith County, and Texas. From 1990 to 2010, the population growth rates of Lindale (25.7 percent) and Smith County (28.4 percent) were lower than the statewide rate of 49.5 percent. Between 2020 and 2040, Lindale is projected to grow by 56.4 percent, from 3,627 persons to 4,773 persons.

Table 12 Population (1990-2010) and Population Projections (2020-2040)

	1990[2]	2000[2]	2010[3]	% Change 1990-2010	2020[3]	2030[3]	2040[3]	% Change 2010-2040
Lindale[1]	2,428	2,281	3,051	25.7%	3,627	4,201	4,773	56.4%
Smith County	151,309	174,706	194,223	28.4%	208,737	223,251	237,766	22.4%
Texas	16,986,510	20,747,282	25,388,403	49.5%	29,650,388	33,712,020	37,734,422	48.6%

[1]Refers to the Lindale Water User Group, which does not correspond to Census geography. [2]Source:U.S. Census Bureau: 1990, 2000; [3]Source: Texas Water Development Board, 2011 Population Projections Data

The proposed project crosses or is adjacent to 12 populated Census 2010 blocks. These blocks are within Block Group (BG) 4 of Census Tract (CT) 14.01, BG 1 of CT 14.03, and BG 2 of CT 14.04 (see **Figure 8**). BG 5 of CT 14.01 is adjacent to the proposed project. These geographies are considered to be the demographic study area for the proposed project.

III.B.1.b. Population Characteristics

The demographic study area block groups have a minority population ranging from 4.2 to 28.1 percent; while demographic study area blocks have minority populations ranging from zero percent to approximately 56 percent (see **Table 13**). Only one block has a minority population greater than 50 percent; Block 2095 in BG 2, CT 14.04 has a minority population of approximately 56 percent.

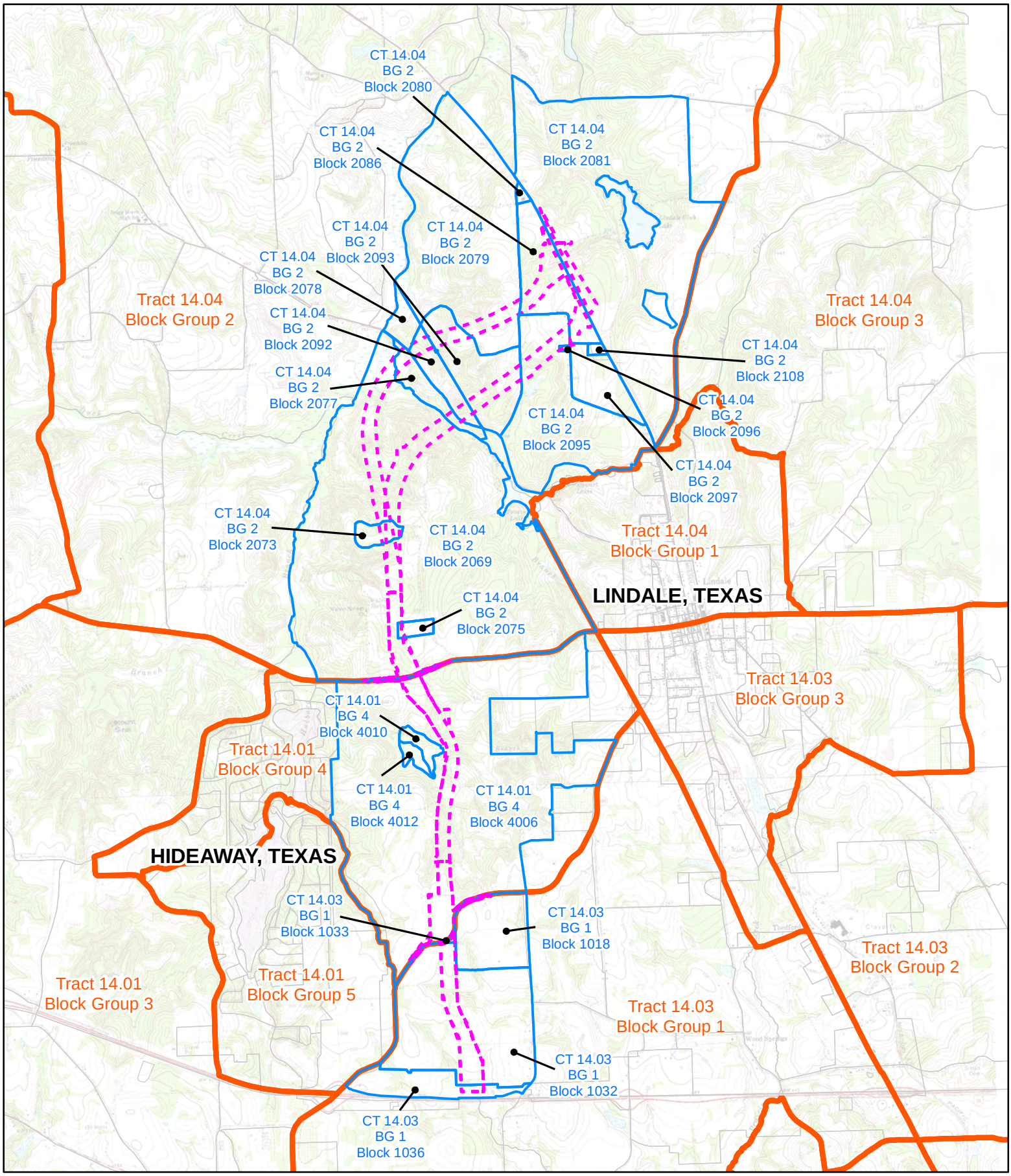


Figure 8

2010 Census Tracts, Block Groups and Blocks

Key to Features

- Project Area
- Census Blocks
- Census Block Groups

Table 13 2010 Demographic Characteristics													
Geography			Total Population	Not Hispanic or Latino							Hispanic or Latino of Any Race	Total Minority Population	Total % Minority Population
				White Alone	Black or African American	American Indian and Alaska Native	Asian	Pacific Islander	Other Race	Two or More Races			
Smith County, Texas			**209,714**	**130,246**	**37,195**	**734**	**2,550**	**63**	**225**	**2,613**	**36,088**	**79,468**	**37.9%**
BLOCK GROUPS													
CT	BG												
14.01	5		1,999	1,916	4	5	8	1	3	8	54	83	4.2%
14.01	4		1,958	1,805	23	4	10	1	-	24	91	153	7.8%
14.03	1		1,976	1,420	310	10	15	2	-	30	189	556	28.1%
14.04	2		1,864	1,540	169	7	11	-	-	21	116	324	17.4%
BLOCKS													
CT	BG	Block											
14.01	4	4006	477	403	19	-	5	-	-	12	38	74	15.5%
14.03	1	1018	28	18	-	-	-	-	-	-	10	10	35.7%
14.03	1	1032	21	21	-	-	-	-	-	-	-	-	0.0%
14.04	2	2069	625	509	53	1	8	-	-	12	42	116	18.6%
14.04	2	2075	43	39	-	-	-	-	-	1	3	4	9.3%
14.04	2	2079	34	23	7	3	-	-	-	-	1	11	32.4%
14.04	2	2081	104	96	-	-	-	-	-	2	6	8	7.7%
14.04	2	2086	24	15	8	-	-	-	-	1	-	9	37.5%
14.04	2	2093	7	7	-	-	-	-	-	-	-	-	0.0%
14.04	2	2095	68	30	36	-	-	-	-	-	2	38	55.9%
14.04	2	2097	78	42	19	-	-	-	-	-	17	36	46.2%
14.04	2	2108	15	9	-	-	-	-	-	-	6	6	40.0%

1 Source: Census 2010 PL94-171 Redistricting Data for Texas, Table P-2

Table 14 summarizes age distribution data for the demographic study area and comparison areas. The four BGs in the demographic study area generally had a lower percentage of younger persons (under 18) and a higher percentage of older persons (over 64) compared to Lindale and Smith County.

Table 14 2010 Age Distribution

	Total population	Under 18	Percent	18-64	Percent	Over 64	Percent
Block Group 5, Census Tract 14.01, Smith County, Texas	1,999	270	14%	842	42%	887	44%
Block Group 4, Census Tract 14.01, Smith County, Texas	1,958	375	19%	1,004	51%	579	30%
Block Group 1, Census Tract 14.03, Smith County, Texas	1,976	487	25%	1,200	61%	289	15%
Block Group 2, Census Tract 14.04, Smith County, Texas	1,864	504	27%	1,103	59%	257	14%
Block Group Totals	7,797	1,636	21%	4,149	53%	2,012	26%
Census Tract 14.01, Smith County, Texas	8,375	1,729	21%	4,448	53%	2,198	26%
Census Tract 14.03, Smith County, Texas	7,156	2,016	28%	4,193	59%	947	13%
Census Tract 14.04, Smith County, Texas	5,724	1,635	29%	3,277	57%	812	14%
Census Tract Totals	21,255	5,380	25%	11,918	56%	3,957	19%
City of Lindale	4,818	1,413	29%	2,693	56%	712	15%
Smith County	209,714	53,796	26%	126,067	60%	29,851	14%

Source: 2010 Census, Table P12.

Table 15 summarizes the level of educational attainment for the demographic study area and comparison areas, according to the American Community Survey (ACS) five-year estimates for 2007-2011. The population in the demographic study area has a similar pattern of educational attainment to Smith County and the State of Texas. In the demographic study area, Census Tract 14.01 has the highest percentage of the population with a bachelor's degree or higher.

Table 15 2011 Educational Attainment

	Texas	Smith County, Texas	Census Tract 14.01, Smith County, Texas	Census Tract 14.03, Smith County, Texas	Census Tract 14.04, Smith County, Texas
Population 18 to 24 years	2,555,821	22,345	1,376	409	283
Less than high school graduate	19.9%	19.7%	8.5%	4.6%	0.0%
High school graduate (includes equivalency)	30.9%	31.0%	25.9%	34.0%	43.1%
Some college or associate's degree	42.1%	43.1%	58.6%	57.0%	56.9%
Bachelor's degree or higher	7.1%	6.2%	7.0%	4.4%	0.0%

Table 15 2011 Educational Attainment (continued)					
	Texas	**Smith County, Texas**	**Census Tract 14.01, Smith County, Texas**	**Census Tract 14.03, Smith County, Texas**	**Census Tract 14.04, Smith County, Texas**
Population 25 years and over	15,443,904	131,447	5,825	3,985	3,064
Less than 9th grade	9.8%	6.7%	3.2%	1.8%	3.0%
9th to 12th grade, no diploma	9.8%	8.6%	8.7%	6.6%	11.8%
High school graduate (includes equivalency)	25.7%	26.8%	27.1%	34.5%	28.0%
Some college, no degree	22.3%	24.4%	26.0%	32.9%	23.9%
Associate's degree	6.4%	9.0%	6.3%	10.1%	9.5%
Bachelor's degree	17.4%	16.7%	20.2%	11.7%	16.9%
Graduate or professional degree	8.6%	7.8%	8.3%	2.3%	6.9%
Percent high school graduate or higher	80.4%	84.7%	88.1%	91.6%	85.2%
Percent bachelor's degree or higher	26.1%	24.5%	28.6%	14.0%	23.8%

Source: ACS 5-year Estimates, 2007-2011, Table S1501.

III.B.1.c. Limited English Proficiency

Executive Order 13166, "Improving Access to Services for Persons with Limited English Proficiency," requires federal agencies to examine the services they provide and identify any need for services to those with Limited English Proficiency (LEP). Executive Order 13166 requires federal agencies to work to ensure that recipients of federal financial assistance, such as TxDOT, provide meaningful access to their LEP applicants and beneficiaries. Failure to ensure that LEP persons can effectively participate in or benefit from federally assisted programs and activities may violate the prohibition under Title VI of the Civil Rights Act of 1964, 42 U.S.C. 2000d and Title VI regulations against national origin discrimination.

For the purposes of this analysis, LEP individuals are those listed in the 2007-2011 ACS as speaking English less than "very well." ACS data for the four BGs in the demographic study area were compiled and the proportion of LEP persons in each BG was determined (see **Table 16**). Each of the demographic study area BGs has an LEP population with proportions ranging from zero percent to 10.9 percent. Overall, 264 persons in the demographic study area BGs are considered LEP, representing approximately four percent of the population of the BGs aged five years and older. The language most often spoken by LEP persons in the demographic study area is Asian and Pacific Island languages, followed closely by Other Indo-European languages. There were no indications of LEP populations, such as signs in other languages, observed during field visits.

All public meetings have been advertised in the Spanish-language La Opinion Newspaper as well as the other English language newspapers (Mineola Monitor, Tyler Morning Telegraph, and Lindale News & Times). Public meeting notices provided TxDOT contact for individuals needing communication assistance; however, no requests for assistance were received. To ensure full and fair public participation, all future public involvement efforts will include the availability of TxDOT and project team representatives to assist with translation services, if requested.

Table 16 2011 Limited English Proficiency, Demographic study area Block Groups

	CT 14.01 BG 5	CT 14.01 BG 4	CT 14.03 BG 1	CT 14.04 BG 2
Population 5 years and over	1,847	2,085	1,621	1,465
Speak only English	1,847	1,821	1,576	1,290
Spanish	0	150	26	5
Speak English "very well"	0	121	26	0
Speak English "well"	0	29	0	5
Speak English "not well"	0	0	0	0
Speak English "not at all"	0	0	0	0
Other Indo-European languages	0	110	19	0
Speak English "very well"	0	34	19	0
Speak English "well"	0	50	0	0
Speak English "not well"	0	26	0	0
Speak English "not at all"	0	0	0	0
Asian and Pacific Island languages	0	2	0	80
Speak English "very well"	0	2	0	0
Speak English "well"	0	0	0	49
Speak English "not well"	0	0	0	31
Speak English "not at all"	0	0	0	0
Other languages	0	2	0	90
Speak English "very well"	0	2	0	16
Speak English "well"	0	0	0	74
Speak English "not well"	0	0	0	0
Speak English "not at all"	0	0	0	0
Totals				
Do not speak English “very well”	0	105	0	159
Do not speak English “very well” (%)	0.0%	5.0%	0.0%	10.9%

Source: ACS 5-year Estimates, 2007-2011, Table B16004

III.B.2. Economic Characteristics

III.B.2.a. Income and Housing

According to data from the ACS, 2011 median household incomes in the demographic study area BGs range from $49,315 in BG 1 in CT 14.03 to $68,497 in BG 5 in CT 14.01 (see **Table 17**). Every year, the U.S. Department of Health and Human Services (DHHS) calculates a poverty guideline to determine financial eligibility for certain programs. In 2013, the DHHS guideline is $23,550 for a family of four. All of the demographic study area BGs and CTs have median household incomes well above this level.

Median home values in 2011 in the demographic study area ranged from $106,900 in BG 2, CT 14.04 to $175,000 in BG 4, CT 14.01, compared to $127,700 in Lindale and $119,800 in Smith County.

Table 17 2011 Median Household Income and Home Value

Geography	Median Household Income	Median Home Value
Block Group 5, Census Tract 14.01	$68,497	$160,100
Block Group 4, Census Tract 14.01	$65,926	$175,000
Block Group 1, Census Tract 14.03	$49,315	$135,400
Block Group 2, Census Tract 14.04	$51,484	$106,900
Census Tract 14.01	$57,672	$148,000
Census Tract 14.03	$49,355	$128,200
Census Tract 14.04	$48,190	$124,100
City of Lindale	$45,676	$127,700
Smith County	$46,615	$119,800

Source: ACS 5-year Estimates, 2007-2011, Tables S1903, DP04, and B25077

III.B.2.b. Labor Force Trends

According to the Lindale Economic Development Corporation, Lindale's largest employer is Target; the Target Distribution Center employed approximately 725 workers in 2011. Lindale ISD is the second largest employer, with approximately 550 full time employees.

The Texas Workforce Commission (TWC) collects employment data for the state. **Table 18** summarizes the annual average for labor force statistics for Smith County from 2002 to 2012. With the exception of 2008-2009, the number of persons employed has increased every year. The percentage of unemployed persons was at a low of 4.2 percent in 2007 and continued to climb each year until 2011, when a slight drop was recorded. Smith County labor force trends are very similar to those of the State of Texas as a whole.

Table 18 Labor Force Statistics for Smith County, 2002-2012					
Date	Employment		Unemployment		
	Total	% Change Year Ago	Rate	Unit Change Year Ago	Rate--State of Texas
2002	85,306	2.9	5.6	0.7	6.4
2003	87,222	2.2	6.0	0.3	6.7
2004	89,792	2.9	5.4	-0.6	6.0
2005	90,804	1.1	5.0	-0.3	5.4
2006	91,647	0.9	4.7	-0.3	4.9
2007	92,487	0.9	4.2	-0.4	4.4
2008	93,692	1.3	4.9	0.7	4.9
2009	93,331	-0.4	7.5	2.5	7.5
2010	94,620	1.4	7.9	0.4	8.2
2011	95,963	1.4	7.8	-0.1	7.9
2012	98,834	3	6.9	-1	6.8

Source: U.S. Bureau of Labor Statistics and Real Estate Center at Texas A&M University

Projected total employment for Lindale is 4,100 to 4,500 in 2015 and 5,500 to 6,200 in 2025; total employment for Smith County is projected at 104,000 to 110,000 in 2015 and 124,000 to 130,000 (City of Lindale, 2004).

III.B.2.c. Employment by Industry

Education and Health Services, along with Trade, Transportation and Utilities, were the two largest employment sectors in Smith County in 2011 (see **Table 19**). **Table 19** also presents the Location Quotients (LQs) for Smith County and the state of Texas, as compared to the United States as a reference area. An LQ greater than one indicates an industry with a greater share of the local area employment than is the case in the reference area (the United States). Compared to the United States, Smith County has a much higher concentration of Natural Resources and Mining employment.

Table 19 2011 Percentage of Employment by Industry and Location Quotient for Smith County, Texas				
	Percentage of Employment		Location Quotient (comparison to US as a whole)	
Industry Sector	Smith County	Texas	Smith County	Texas
Natural Resources and Mining	3.52%	3.39%	1.94	2.02
Construction	4.51%	6.54%	1.29	0.89
Manufacturing	7.52%	9.68%	0.9	0.7
Trade, Transportation, and Utilities	23.39%	24.26%	1.06	1.02
Information	2.64%	2.26%	0.91	1.07
Financial Activities	5.13%	7.26%	1.06	0.75
Professional and Business Services	10.85%	15.51%	0.97	0.68
Education and Health Services	25.82%	15.53%	0.88	1.47
Leisure and Hospitality	12.33%	12.06%	0.98	1.0
Other Services	4.27%	3.47%	0.85	1.05
Unclassified	0.01%	0.04%	0.24	0.07

Source: US Bureau of Labor Statistics, 2012

Like Smith County, the largest employment sector in two of three demographic study area Census tracts is Educational and Health Services (see **Table 20**). Information services represent the smallest employment sector in the demographic study area.

Table 20 2010 Employment by Industry for Demographic Study Area Census Tracts

Industry	Census Tract 14.01	Census Tract 14.03	Census Tract 14.04
Agriculture, forestry, fishing and hunting, and mining	5%	2%	2%
Construction	5%	6%	9%
Manufacturing	11%	9%	9%
Wholesale trade	6%	3%	4%
Retail trade	9%	17%	9%
Transportation and warehousing, and utilities	3%	9%	4%
Information	0%	1%	1%
Finance and insurance, and real estate and rental and leasing	4%	13%	8%
Professional, scientific, and management, and administrative and waste management services	13%	5%	8%
Educational services, and health care and social assistance	22%	16%	31%
Arts, entertainment, and recreation, and accommodation and food services	10%	9%	9%
Other services, except public administration	8%	6%	4%
Public administration	6%	4%	2%

Source: ACS 5-year Estimates, 2007-2011, Table DP03

III.B.3. Community Characteristics

There are many definitions of community. This analysis of community impacts focuses on the geographic, or spatial, aspect of community and looks at the proposed project's impacts in terms of the communities of Lindale and Hideaway. While the city of Hideaway and older portions of Lindale appear to be cohesive communities, the area that would be crossed by the proposed project consists mainly of scattered rural residences. In addition to these neighborhoods, residential subdivisions, including Fox Run Estates, Stevenson Creek Estates, Westwood Subdivision, and others shown on **Figure 4** are located in the project area. Population and demographic characteristics for Lindale, such as population growth, ethnicity and race, income, and employment status, are included above in **Sections III.B.1** and **III.B.2**. Information about the project area land uses and businesses are included in **Section III.A.2** and depicted on the **Potential Environmental Constraints Plates 1-7** in **Appendix A**.

Lindale's motto is "Good Country Living." Known in the past as the blackberry capital of the world, the city of Lindale is described as "a vibrant community in East Texas with a rich cultural heritage" on its website. It is located approximately ten miles northwest of Tyler and approximately 80 miles east of Dallas. The railroad tracks between Tyler and Mineola going through Lindale facilitated the growth of the canning and fruit packing industries. By 1921, the second hard-surface road in the county, the Jim Hogg Highway, had been constructed from Tyler to Lindale. Nearby communities include Hideaway, Mount Sylvan, Red Springs, Sand Flat,

Swan, and Wood Springs. Recently the City has begun efforts to create a "town center" atmosphere where much of the development is occurring along US 69 between IH 20 and FM 16.

In 1965 the population of Lindale was 1,285. Lindale continued to grow, particularly in the 1970s, because of its proximity to Tyler and IH 20. By 2000 the population was 2,954 with 398 businesses (McCrosky, 2013a). Though Lindale's fruit and vegetable production has declined over the past few decades, forcing many workers to find jobs in other cities such as Tyler, it has been replaced by cattle, hay and rose production (Hall, 1996). As shown in **Table 20**, the agriculture industry currently employs a small portion of the population. The Lindale school district has a reputation as one of the "finest public school systems in the state" (http://www.hideawaytexas.net). According to Charles West, Fire Marshall and Building Official for the City of Lindale, the school district, environment, and small town atmosphere are important quality of life attributes that attract new residents to Lindale (West, 2008).

The city of Hideaway is a private, gated community west of Lindale. Developed in 1967, Hideaway features over 1,600 homes arranged around three lakes and a golf course. In 2000 the city incorporated under the organization of Hideaway Lake Club, Inc. Hideaway has a mayor-council form of government as well as a twelve-member board of directors. Private security and a volunteer fire department also serve the community. In 2000, Hideaway had a population of 3,800. Early in the planning and scoping phases of the project, many residents of Hideaway, including the mayor, expressed concern about potential noise and air quality impacts to their community, stating that the proposed project would not substantially improve transportation access for the residents of Hideaway. A petition and several letters were sent to TxDOT opposing the preliminary corridor alternatives closest to Hideaway. The westernmost preliminary corridor alternative was of the most concern to the Mayor and residents of Hideaway; however, this preliminary corridor alternative was not determined to be a reasonable alternative to be carried forward for further consideration.

III.C. Existing Noise Environment

The existing noise environment in the project area is generally consistent with the low levels found in mostly rural or low density residential areas. Noise levQueenels generally increase in areas adjacent to existing cross roads.

Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB."

Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate

the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dB(A)."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent noise level and is expressed as "Leq."

To determine existing noise levels, field measurements were collected within the proposed project areas for each alternative. Noise levels for the existing conditions were measured using a Quest Model Q-300 Noise Dosimeter. Each day prior to use, the dosimeter was calibrated using a Quest Model QC-10 Acoustic Calibrator.

Noise measurement locations were selected based on location relative to the proposed right-of-way, representativeness of the area, and accessibility. All noise level measurement locations were recorded using a hand-held GPS device. Wind speed was monitored during noise measurements and documented. During noise measurements, roads were dry and wind speeds were generally less than 15 mph during noise level measurements except as noted in the table below. **Table 21** presents the results of the noise level measurements. Measured noise locations are identified in **Potential Environmental Constraints Plates 1–7** in **Appendix A**.

Table 21 Existing Noise Level Field Measurements

Noise Level Measurement ID	Date	Noise Level Measurement Start Time (24:00)	Duration (min)	Road Conditions	Average/Maximum Wind Speed (mph)	Average Noise Level (dB(A))
NL 1	2/27/2008	10:40	15	Dry	calm	32.3
NL 2	2/27/2008	11:45	15	Dry	calm	32.6
NL 3	2/27/2008	12:27	15	Dry	5/9.1	48.9
NL 4	2/27/2008	16:00	18	Dry	Light breeze*	46.7
NL 5	2/27/2008	17:35	15	Dry	Light breeze*	48.2
NL 6	2/28/2008	09:10	15	Dry	5.1/15.7 Gust**	54.4*
NL 7	2/28/2008	10:09	15	Dry	8.1/16.8 Gust**	53.2*
NL 8	2/28/2008	11:15	15	Dry	6.7/17.5 Gust**	62.7*
NL 9	2/28/2008	12:20	15	Dry	4.0/12.5	47.3
NL 10	6/11/2008	08:45	20	Dry	4.5/10.3	62.7

Note:
*Wind speed not measured but reported as significantly less than 15 mph.
**These average noise levels were not used as background data since wind speeds exceeded 15 mph during noise measurement.

III.D. Geology and Soils

III.D.1. Geologic Overview

The geologic setting of the proposed project is controlled by the structural variations within the East Texas Basin, a major down-warping of the Earth's crust that encompasses part or all of 17 counties. This basin is bounded on the west and north by the Mexia-Talco Fault Zone, on the

south by the Elkhart Graben-Mount Enterprise Fault System, and on the east by the Sabine Uplift (Ewing, 1990). In its deepest parts, the East Texas Basin contains more than 13,100 feet of Mesozoic and Tertiary sedimentary section above the Louann Salt of Middle Jurassic age. The weight of approximately three miles of sedimentary section has mobilized the Louann Salt, thereby forming a complex array of salt deformation structures. Salt domes locally penetrate virtually the entire overlying section. One such feature, the Mt. Sylvan Salt Dome, occurs within the project area.

Smith County occupies the Tyler Basin, a subsidiary structure that trends along the axis of the East Texas Basin; the project area lies near the southeast margin of the basin axis. The limits of the Tyler Basin are clearly marked by the mapped contact between the Sparta Sand and the Weches Formation, the two youngest members of the Claiborne Group of Eocene age within this part of Texas (Barnes, 1975). This contact forms a roughly elliptical area trending slightly northeast-southwest with its center approximately at the city of Tyler.

III.D.2. Physiographic Setting

The proposed project area occupies part of the East Texas Piney Woods, as described by Ferguson (1986). This area is characterized by sandy soils and pine-covered hills dissected by numerous drainage courses. Typical hill-to-valley relief in the project area is approximately 164 feet. The project area is drained by several well-developed creek systems that flow generally northeast and southeast.

III.D.3. Geology

The geologic setting beneath the proposed build alternatives for the Lindale Reliever Route is characterized by Tertiary formations, including Sparta Sand, Weches Formation, and Queen City Sand of Eocene Age (UT-BEG, 1965). These units are described below.

Sparta Sand underlies much of the central and southern portions of the proposed project, particularly in the area south of FM 849. It consists of fine to medium grained, locally carbonaceous quartz sand that is light gray to brownish gray in color and weathers to various shades of light gray. The base of the formation is hard brown, ferruginous sandstone approximately 170 feet thick. A silt and clay matrix lends a slight cohesiveness. Interbeds of sandy clay are more abundant toward the surface layers.

The Weches Formation, along with Sparta Sand, underlies much of the central and southern portions of the proposed project; it surrounds the Sparta Sand formation. It is composed of thin-bedded grayish green to grayish olive green glauconite and quartz sand interbedded with light brown to moderate light gray, silty, muscovitic clay. This formation weathers moderate to dark

reddish brown. Locally, it forms limonitic and sideritic iron ore and clay ironstone concretions. Marine megafossils are present in the southern portion of the formation. Thickness is approximately 35 feet, but can range from 0 to 70 feet.

Queen City Sand underlies the majority of the northern portion of the project area. It is composed of fine grained to locally medium grained, light gray to brownish gray, locally carbonaceous quartz sand and gray to brown, silty, slightly lignitic clay. Sand is most abundant to the west. The formation becomes red and white mottled as it weathers. Ironstone concretions and ledges are common. Local beds of cross-bedded glauconite quartz greensand found within this formation weathers to ferruginous ledges and rubble. Thickness ranges from 100 to 400 feet, thinning southeastward.

III.D.4. Minerals and Energy Resources

Mineral and energy resources along the proposed Lindale Reliever Route corridor include near-surface deposits of sand, ironstone (from which iron can be extracted), and greensand (used in garden fertilizers and as a water softener) from the Sparta, Weches, and Queen City Formations (UT-BEG, 1965). In addition, the Mt. Sylvan Salt Dome is located approximately five miles south of the project area, affording the potential for halite, native sulfur, gypsum, and petroleum.

The entire proposed project crosses potential economic mineral deposits, but, for the most part, these potential resources are widespread and not unique to the project area. Sand is extracted locally throughout east Texas for fill material, construction aggregate, and industrial purposes. There are a few gravel pits and topsoil extraction areas in the vicinity of the project area, but no known production of a specialty mineral commodity. The construction of a new roadway would spur demand for mineral resources, which may result in expansion of existing sites or creation of new sites.

III.D.5. Soils

III.D.5.a. General Description of Soil Associations

Three soil associations occur within the project area (NRCS, 1993): Wolfpen-Pickton, Redsprings-Cuthbert-Elrose, and Mantachie (NRCS, 1993). A brief discussion of each of these soil associations is provided below. Two of these, the Wolfpen-Pickton and Redsprings-Cuthbert-Elrose associations, are gently sloping to steep soils that are found under dominantly hardwood forests on uplands. Although hardwoods are the dominant native vegetation, many areas have been cleared for pasture and crops. Pines have reforested some areas that were formerly pastureland. The third soil association, the Mantachie, consists of soils that have formed under hardwood forests on floodplains (NRCS, 1993).

The Wolfpen-Pickton soil association is found underlying the majority of the Lindale Reliever Route project area. It contains gently sloping to moderately steep, well drained, sandy soils with loamy subsoil. Approximately 30 percent of the soil in Smith County belongs to the Wolfpen-Pickton soil association, with approximately 35 percent Wolfpen soil and approximately 32 percent Pickton soil. The remaining 33 percent of the association is comprised of various other soil types, including Bernaldo, Besner, Cuthbert, Cerly, Gallime, Keechi, Leagueville, Mantachie, Raino, Redsprings, and Tonkawa. The Wolfpen-Pickton soil association is dominant throughout most of the project area. While most areas encompassed by the Wolfpen-Pickton soil group are now pasture, native hardwoods and plantations of pines grow in other areas. Some crops, including watermelons, roses, peas, and sweet potatoes, are grown in this soil group, but the addition of fertilizer and lime is usually required to bring about desired yields (NRCS, 1993).

The Redsprings-Cuthbert-Elrose soil association underlies a small area at the southern terminus of the proposed project, in the vicinity the tributary to Long Brake Creek. Soils in this association occur in areas of gentle to steep slopes and are well drained, loamy and gravelly, with clayey or loamy subsoil. The Redsprings-Cuthbert-Elrose soil association makes up approximately 17 percent of the county. Particular soil groups are divided as follows: Redsprings – 33 percent; Cuthbert – 27 percent; Elrose – 16 percent; and soils of minor extent – 24 percent. Soils of minor extent include Alto, Attoyac, Briey, Kirvin, Mantachie, Oakwood, Owentown, Pickton, and Wolfpen. The Redsprings-Cuthbert-Elrose soil association is found in some western portions of the project area. Most of the areas encompassed by this soil association support woodlands/forestland. Hardwoods and some pines typically grow on these soils and often constitute good wildlife habitat. Some areas have been cleared for use as pasture or cropland. Typical crops grown on soils of this association include corn, peas, beans, and sweet potatoes (NRCS, 1993).

The Mantachie soil association generally follows Duck Creek; within the project area these soils underlie a small area in the vicinity of Stevenson Branch. Mantachie soils are loamy, frequently flooded, and poorly drained soils that typically occur on nearly level floodplains along most of the major streams in Smith County. Soils of this association account for only about six percent of the total area of the county. Mantachie soil makes up approximately 73 percent of this association, with the remaining 27 percent made up of soils of minor extent, including Bernaldo, Galine, Keechi, and Owentown. Much of the area encompassed by the Mantachie soil association is forestland. Hardwoods dominate the tree cover because flooding and inundation severely limit the growth of pine. Many of the deforested areas are used as pasture. Soils of this group are not typically used for croplands or urban uses because of the threat of occasional flooding (NRCS, 1993).

III.D.5.b. Descriptions of Soil Series in the Project Area

Twelve (12) soil series underlie the build alternatives; these include soils from the Cuthbert, Elrose, Keechi, Mantachie, Oakwood, Owentown, Pickton, Redsprings, and Wolfpen soil groups (NRCS, 1993). Each of the soil series are described in more detail in the following paragraphs, with pertinent engineering and environmental characteristics summarized in **Tables 22** and **23**.

- Cuthbert fine sandy loam, five to 20 percent slopes – In the project area, this soil is found associated with the tributary to Long Brake Creek at the southern project terminus and with Davis Branch and its tributaries. This is a strongly sloping/moderately steep upland soil found along breaks to drainageways. The soil is well drained with rapid surface runoff, moderately slow permeability, and moderate available water capacity.

- Cuthbert gravelly fine sandy loam, 12 to 30 percent slopes – In the project area, this soil is found along Alternative D, just north of Stevenson Branch. It is a moderately steep/steep soil found on side slopes in uplands. The soil is well drained, with rapid surface water runoff and moderately slow permeability.

- Elrose fine sandy loam, three to eight percent slopes – This soil is found near Stevenson Branch. It is a gently to strongly sloping soil found on foot slopes above drainageways in the uplands. The soil is well drained, with medium to rapid surface runoff, moderate permeability, and a high available water capacity.

- Keechi loam, frequently flooded – Keechi soils in the project area are found along Stevenson Branch. This soil is classified as hydric and is often associated with wetlands because it is poorly drained with slow surface runoff and a seasonal high water table near the surface for approximately half of the year. This soil is also well suited to wetland plants. These soils experience flooding two to three times per year, with a typical duration of one to three days.

- Mantachie loam, frequently flooded – In the project area, these soils are associated with Davis Branch. Mantachie soils are classified as hydric. They are poorly drained with surface runoff, making them suitable for the occurrence of wetlands. This soil is flooded, on average, one to two times per year, for two to seven days at a time.

- Oakwood fine sandy loam, five to eight percent slopes – This soil is found associated with the tributary to Long Brake Creek at the southern project terminus. It is a strongly sloping upland soil that is generally found along breaks to drainageways. It

is moderately well drained with medium surface runoff and moderately slow permeability.

- Owentown loamy fine sand, occasionally flooded – This soil is associated with Davis Branch and its tributaries. It is classified as hydric and is typically found on floodplains, natural stream levees, and alluvial fans. The soil is moderately well drained with slow surface runoff. Permeability and available water capacity are moderate.

- Pickton loamy fine sand, one to six percent slopes – This soil is widely distributed throughout the project area. It is a gently sloping soil found on broad interstream divides in the uplands. The soil is well drained with very slow surface runoff and moderate permeability.

- Pickton loamy fine sand, eight to 15 percent slopes – In the project area, this soil is associated with Davis Branch and its tributaries. It is a strongly sloping/moderately steep soil found on side slopes along drainageways. It is a well drained soil with very slow surface runoff and moderate permeability. Available water capacity is very low.

- Redsprings very gravelly sandy loam, eight to 25 percent slopes – This soil is associated with Davis Branch and its tributaries. It is a strongly sloping/steep soil found on hillslopes above drainageways in the uplands. The soil is well drained, with rapid surface runoff and moderately slow permeability.

- Wolfpen loamy fine sand, one to six percent slopes – This soil is widely distributed throughout the project area. It is classified as hydric. The soil is gently sloping and found on broad interstream divides in the uplands. It is well drained with slow surface runoff and moderate permeability and available water capacity.

- Wolfpen loamy fine sand, eight to 15 percent slopes – Within the project area, this soil is found associated with the tributary to Prairie Creek. It is a sloping to moderately steep soil on side slopes above drainageways. The soil is well drained, with slow surface runoff and moderate permeability and available water capacity.

Table 22 Pertinent Engineering Characteristics of Soil Series Within the Project Area

Soil Series	Engineering Characteristics			
	Runoff Potential	**Hydrological Considerations**	**Roadfill Suitability**	**Roadway Location Limitations**
Cuthbert fine sandy loam, 5 to 20 percent slopes	Well drained	Occupies breaks to drainageways in uplands	Fair: low strength, shrink-swell	Severe: low strength, slope, shrink-swell

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Table 22 Pertinent Engineering Characteristics of Soil Series Within the Project Area (continued)				
Soil Series	**Engineering Characteristics**			
	Runoff Potential	**Hydrological Considerations**	**Roadfill Suitability**	**Roadway Location Limitations**
Cuthbert gravelly fine sandy loam, 12 to 30 percent slopes	Well drained	Occupies breaks to drainageways or steep hills in uplands	Fair: low strength, slope, shrink-swell	Severe: slope, shrink-swell
Elrose fine sandy loam, 3 to 8 percent slopes	Well drained	Occupies foot slopes above drainageways in the uplands	Poor: low strength	Severe: low strength, shrink-swell
Keechi loam, frequently flooded	Poorly drained	Occupies floodplains	Poor: wetness	Severe: ponding, depth to saturated zone, flooding
Mantachie loam, frequently flooded	Somewhat poorly drained	Occupies nearly level floodplains along the meander of streams	Fair: wetness	Not rated
Oakwood fine sandy loam, 5 to 8 percent slopes	Moderately well drained	Occupies breaks to drainageways in uplands	Good	Slight
Owentown loamy fine sand, occasionally flooded	Moderately well drained	Occupies floodplains, natural stream levees, and alluvial fans	Fair: wetness	Severe: flooding
Pickton loamy fine sand, 1 to 6 percent slopes	Well drained	Occupies broad interstream divides in uplands	Good	Slight
Pickton loamy fine sand, 8 to 15 percent slopes	Well drained	Occupies side slopes along drainageways	Good	Moderate: slope
Redsprings very gravelly sandy loam, 8 to 25 percent slopes	Well drained	Occupies hillslopes above drainageways in uplands	Fair: shrink-swell, low strength, slope	Severe: slope, shrink-swell, low strength
Wolfpen loamy fine sand, 1 to 6 percent slopes	Well drained	Occupies broad interstream divides in uplands	Good	Slight
Wolfpen loamy fine sand, 8 to 15 percent slopes	Well drained	Occupies side slopes above drainageways	Good	Moderate: slope

2 Sources: Natural Resource Conservation Service (NRCS). Soil Survey of Smith County, Texas. 1993. NRCS. Web Soil Survey.
3 http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed February 15, 2007.

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Table 23 Pertinent Environmental Characteristics of Soil Series Within the Project Area				
Soil Series	**Environmental Characteristics**			
	Hydric?	**Prime Farmland?**	**Primary Land Use**	**Position in the Landscape**
Cuthbert fine sandy loam, 5 to 20 percent slopes	No	No	Forest, pasture	Occupies breaks to drainageways in uplands
Cuthbert gravelly fine sandy loam, 12 to 30 percent slopes	No	No	Forest, wildlife habitat	Occupies breaks to drainageways or steep hills in uplands
Elrose fine sandy loam, 3 to 8 percent slopes	No	No	Pasture, forest (a few areas are used as cropland)	Occupies foot slopes above drainageways in the uplands

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Table 23 Pertinent Environmental Characteristics of Soil Series Within the Project Area (continued)

Soil Series	Environmental Characteristics			
	Hydric?	Prime Farmland?	Primary Land Use	Position in the Landscape
Keechi loam, frequently flooded	Yes	No	Wildlife habitat (a few areas are used as pasture)	Occupies floodplains
Mantachie loam, frequently flooded	Yes	No	Forest, pasture	Occupies nearly level floodplains along the meander of streams
Oakwood fine sandy loam, 5 to 8 percent slopes	No	No	Forest, pasture	Occupies breaks to drainageways in uplands
Owentown loamy fine sand, occasionally flooded	Yes	Yes	Forest, pasture	Occupies floodplains, natural stream levees, and alluvial fans
Pickton loamy fine sand, 1 to 6 percent slopes	No	No	Pasture, forest (a few areas are used as cropland)	Occupies broad interstream divides in uplands
Pickton loamy fine sand, 8 to 15 percent slopes	No	No	Forest, pasture	Occupies side slopes along drainageways
Redsprings very gravelly sandy loam, 8 to 25 percent slopes	No	No	Forest, wildlife habitat (a few areas are used as cropland)	Occupies hillslopes above drainageways in uplands
Wolfpen loamy fine sand, 1 to 6 percent slopes	Yes	No	Pasture (a few areas are used as forest, cropland)	Occupies broad interstream divides in uplands
Wolfpen loamy fine sand, 8 to 15 percent slopes	No	No	Pasture, forest	Occupies side slopes above drainageways

Sources: NRCS. Soil Survey of Smith County, Texas. 1993.
NRCS. Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, accessed February 15, 2007.

III.D.5.c. Farmland Protection

The Farmland Protection Policy Act (FPPA), as detailed in Subtitle I of Title XV of the Agricultural and Food Act of 1981, provides protection to prime and unique farmlands as well as farmlands of statewide or local importance. Prime farmland soils, as defined by the United States Department of Agriculture, are soils that are best suited to producing food, feed, fiber, forage, and oilseed crops. Such soils have properties that are favorable for the production of sustained high yields. Prime farmland can include cropland, pastureland, rangeland or forestland, but does not include land converted to urban, industrial, transportation, or water uses. Statewide and locally important farmlands are defined by the appropriate state or local agency as important for the production of food, feed, fiber, forage or oilseed crops. Unique farmlands are not recognized by the NRCS in the state of Texas.

Most of the proposed project area is not within a designated urbanized area, as shown on the U.S. Census Bureau Urban Cluster Map (Census 2010) for Lindale–Hideaway. Therefore, in accordance with the FPPA, the proposed right-of-way was scored using the U.S. Department of Agriculture's Farmland Conversion Impact Rating Form NRCS-CPA- 106. The resulting score was less than 60 for each alternative; therefore, coordination with the NRCS is not required. Copies of the completed forms are included in **Appendix E**.

III.E. Air Quality

Under the Clean Air Act, last amended in 1990, EPA sets National Ambient Air Quality Standards (NAAQS, 40 CFR Part 50) for six criteria pollutants: carbon monoxide (CO), lead, nitrogen dioxide, particulate matter (PM10), particulate matter (PM2.5), ozone, and sulfur dioxide. In 1997, an 8-hour NAAQS for ozone was promulgated by the EPA that was more stringent than the previous 1-hour standard. After the new 8-hour NAAQS was challenged in court (to be eventually upheld in 2002 by the U.S. Supreme Court), the EPA designated Smith, Upshur, Gregg, Harrison, and Rusk Counties (whose local governments comprise the five-county North East Texas Air Care [NETAC] organization) as in attainment on April 15, 2004. An Early Action Compact (EAC) with the EPA and TCEQ was entered into by the NETAC on December 20, 2002, in order to develop and implement a Clean Air Action Plan (CAAP) to reduce ground-level ozone concentrations throughout the five-county area to comply with the 8-hour ozone standard by December 31, 2007. The NETAC EAC program concluded in Spring 2008, at which time the EPA designated the area that had attained the ozone NAAQS as in attainment and those which did not meet the standard as being in nonattainment (Tyler Area MPO, 2010). However, on May 21, 2012, EPA published the final designations for the 2008 8-hour ozone standard (77 FR 30088) in which Gregg, Harrison, Rusk, Smith, and Upshur Counties were designated as attainment/unclassifiable under the 2008 8-hour ozone NAAQS. These designations went into effect on July 20, 2012 (TCEQ 2013).

III.E.1. Project Consistency with Transportation Plans and Funding

The proposed action is consistent with the Tyler Area MPO's 2035 MTP and is included in Appendix C: Project Undergoing Environmental Assessment in the 2013–2016 STIP (see **Appendix E** for copies of the MTP and STIP pages). The proposed project is located in Smith County, which is an area in attainment or unclassifiable for all NAAQS; therefore, the transportation conformity rules do not apply.

III.E.2. CO Traffic Air Quality Analysis

Traffic data for the design year (2033) is 6,700 vehicles per day (vpd). A prior TxDOT modeling study and previous analyses of similar projects demonstrated that it is unlikely that a

carbon monoxide standard would ever be exceeded as a result of any project with an average annual daily traffic (AADT) below 140,000 vpd (TxDOT, 2013). The AADT projects for the proposed project do not exceed 140,000 vpd; therefore, a Traffic Air Quality Analysis (TAQA) was not required.

III.E.3. Congestion Management Process

This project is not in a Transportation Management Area (TMA) and is located in an area that is in attainment or unclassifiable for all NAAQS; therefore, a Congestion Management Process (CMP) analysis is not required.

III.E.4. CO/ PM10 Hot Spot Analysis

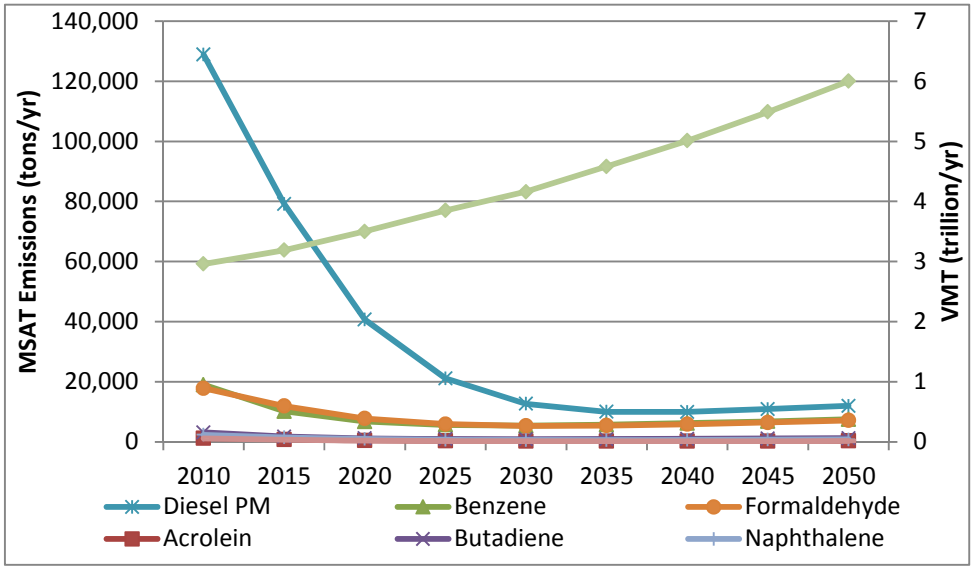
The proposed project is not located within a CO/PM10 nonattainment or maintenance area; therefore, a project-level hot spot analysis is not required.

III.E.5 Mobile Source Air Toxics (MSAT) Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/iris/). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA MSAT rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. Based on an FHWA analysis using EPA's MOVES2010b model, as shown in **Illustration 1** and **Table 24**, even if VMT increases by 102 percent as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Illustration 1:
PROJECTED NATIONAL MSAT EMISSION TRENDS 2010 – 2050
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA's MOVES2010b MODEL



Source: Table 24 below.
Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

Table 24 Projected National MSAT Emission Trends 2010 – 2050
For Vehicles Operating On Roadways Using EPA's Moves2010b Model

Pollutant/ VMT	Pollutant Emissions (tons) and Vehicle-Miles Traveled (VMT) by Calendar Year									Change
	2010	2015	2020	2025	2030	2035	2040	2045	2050	2010 to 2050
Acrolein	1,244	805	476	318	258	247	264	292	322	-74%
Benzene	18,995	10,195	6,765	5,669	5,386	5,696	6,216	6,840	7,525	-60%
Butadiene	3,157	1,783	1,163	951	890	934	1,017	1,119	1,231	-61%
Diesel PM	128,847	79,158	40,694	21,155	12,667	10,027	9,978	10,942	11,992	-91%
Formaldehyde	17,848	11,943	7,778	5,938	5,329	5,407	5,847	6,463	7,141	-60%
Naphthalene	2,366	1,502	939	693	607	611	659	727	802	-66%
Polycyclics	1,102	705	414	274	218	207	219	240	262	-76%
Trillions VMT	2.96	3.19	3.5	3.85	4.16	4.58	5.01	5.49	6	102%

Source: EPA MOVES2010b model runs conducted during May – June 2012 by FHWA.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA. FHWA, EPA, the Health Effects Institute, and others have funded

and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. FHWA will continue to monitor the developing research in this emerging field.

Potential impacts to air quality as a result of the proposed project are discussed by alternative in **Section IV.3**.

III.F. Water Resources

III.F.1. Surface Water

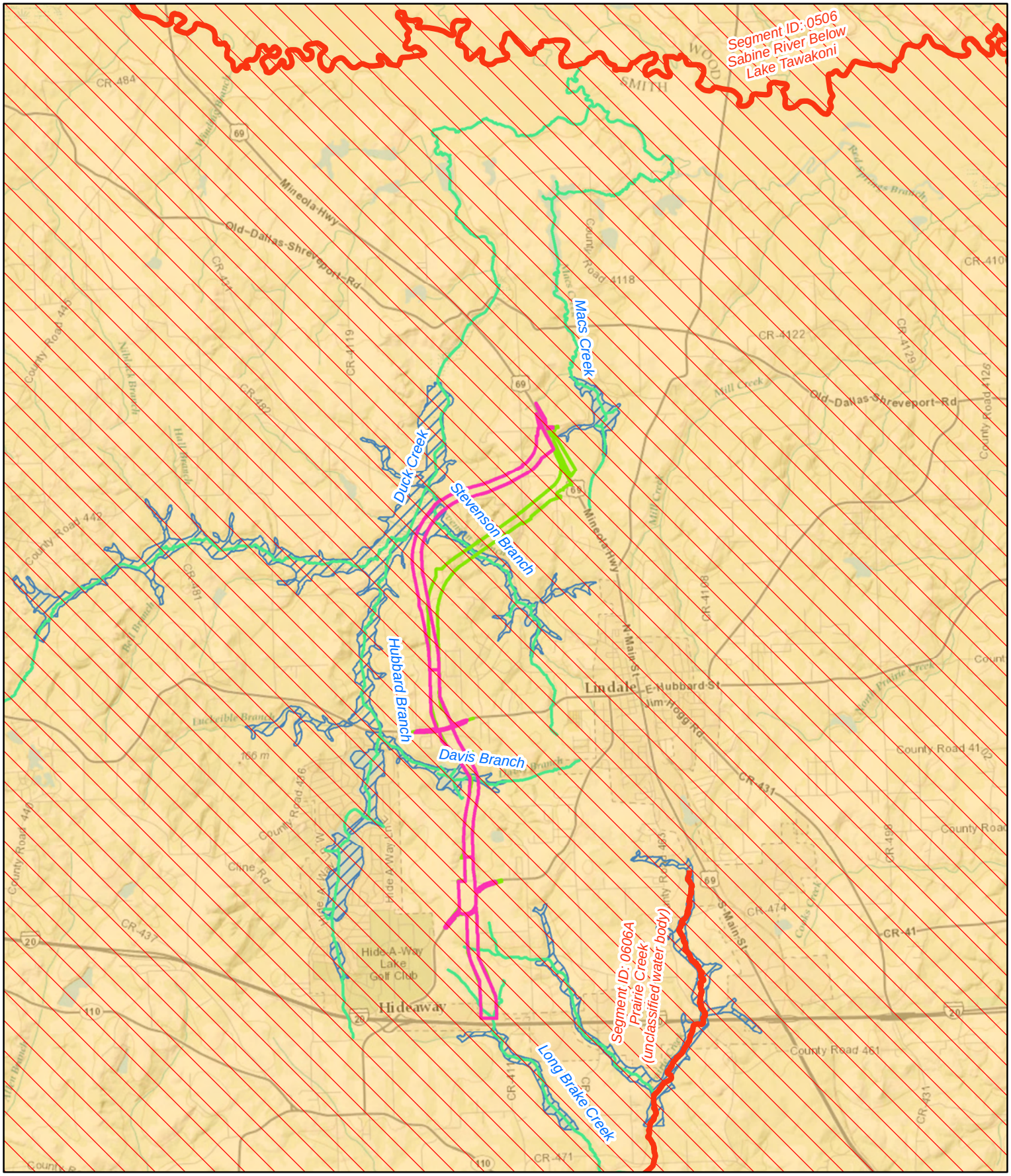
III.F.1.a. Surface Drainage Characteristics

Smith County receives an average of approximately 44 inches of precipitation annually (TSHA, 2007); this rainfall drains to both the Neches and Sabine River basins. The northern portion of the project area is located within the Sabine River basin, and the southern portion is located within the Neches River basin. Surface water features are shown on **Figure 9**.

The Sabine River is formed by three tributaries that arise in Collin and Hunt Counties: Cowleech Fork, Caddo Fork, and South Fork (TCEQ, 2004). The river flows eastward to the junction with the South Fork Sabine River and continues to flow southward for approximately 550 miles to Sabine Lake, formed by the confluence of the Sabine and Neches Rivers. The lake drains to the Gulf of Mexico at Sabine Pass. Two major reservoirs are located on the Sabine River; these are Lake Tawakoni and Toledo Bend Reservoir. The drainage area of the Sabine River encompasses approximately 9,756 square miles, approximately 7,426 of which are in Texas (TCEQ, 2004); the remainder is in Louisiana.

The Neches River originates in Van Zandt County and flows southeast for approximately 416 miles to Sabine Lake, on the northeastern edge of Port Arthur (TSHA, 2007). Two major reservoirs, Lake Palestine and Lake B.A. Steinhagen, are located along the Neches River. Major tributaries to the Neches include the Angelina River, Bayou La Nana, Ayish Bayou, Pine Island Bayou, Village Creek, Kickapoo Creek, and Flat Creek. The river's drainage area encompasses approximately 10,011 square miles (TCEQ, 2004); major cities in the basin include Tyler, Beaumont, Lufkin, and Nacogdoches.

Duck Creek is located to the west/northwest of the proposed project. It originates in northwestern Smith County, north of Carroll, and terminates at the Old Sabine River Channel (Maxwell, 2013). Pine and hardwood forests are common along its length. There are several branches to the creek, including Hubbard Branch, Stevenson Branch, and Davis Branch. The Duck Creek soil erosion project was established in 1929, and in 1934 an approximately 25,000-



N

0 0.625 1.25

Miles

Figure 9

Water Resources

Key to Features

- 303d Impaired Waters
- Streams
- Alternative D
- Alternative G
- Fema Floodplains
- Carrizo - Wilcox Aquifer (subcrop)
- Queen City Aquifer (outcrop)

acre area within the Duck Creek watershed became a demonstration project for testing erosion control methods (THSA, 2008a). Property owners and federal officials, along with Civilian Conservation Corps (CCC) workers, cooperated to develop and implement soil conservation plans for each farm in the area. Hubbard Branch is located to the west of the proposed project. This branch of Duck Creek begins in northwestern Smith County, one mile northwest of Mount Sylvan and two miles east of Carroll, crosses Hideaway Lake, and terminates at Duck Creek (Hubbard Branch, 2013). Stevenson Branch and Davis Branch, and two tributaries to Davis Branch are crossed by the proposed project.

Prairie Creek is located to the east of the proposed project and drains into the Neches River (Prairie Creek, 2013). One tributary to Prairie Creek is crossed by the proposed project.

Long Brake Creek is found to the south of the proposed project. One tributary to Long Brake Creek occurs at the southern terminus of the proposed project.

Lakes in the vicinity of the proposed project include Tomlin Lake and Stewart Lake.

III.F.1.b. Surface Water Quality

The Texas Commission on Environmental Quality (TCEQ) classifies the major surface waters of the state as "segments" for purposes of water quality management and designation of site-specific standards. These classified segments are aggregated by basin. The project area drains to two stream segments, as classified by the TCEQ: the Sabine River below Lake Tawakoni (segment 0506) and the Neches River above Lake Palestine (segment 0606). In addition, Prairie Creek (segment 0606A) is located near the project area, and water runoff from the project area eventually drains into the creek. In order to comply with Section 303(d) of the federal Clean Water Act (CWA) the TCEQ evaluates water body segments and identifies those that do not meet uses and criteria defined in the Texas Surface Water Quality Standards (TSWQS). The 2013 Section 303(d) list classifies segments 0606 and 0606A as impaired. Segment 0506 is not listed as impaired. Segment 0606 is listed as impaired for bacteria, depressed dissolved oxygen, low pH, and zinc in the water; and segment 0606A is listed as impaired for bacteria. Neither of the proposed build alternatives crosses or is located within five miles upstream of these impaired segments. Therefore, coordination regarding water quality impacts is not required under the TxDOT-TCEQ MOU regarding Section 303(d) of the CWA.

III.F.1.c. Floodplains

The project corridor was investigated for encroachments into the 100-year floodplain. This information was obtained from the Federal Emergency Management Agency's (FEMA) Flood Insurance Rate Maps (FIRMs) for Smith County.

The proposed build alternatives would cross 100-year floodplains of Stevenson Brach and Davis Branch. The designated flood hazard boundaries in the project area consist of land adjacent to the defined drainage channels for Stevenson Branch and Davis Branch. More information on potential floodplain encroachments is provided in **Section IV.F.2.b**.

III.F.1.d. Wild and Scenic Rivers

No wild and scenic rivers, as designated by the National Parks Service, are found in the vicinity of the project area.

III.F.1.e. Coastal Barriers

The proposed project is located in Smith County, which is not a coastal county.

III.F.1.f. Coastal Zone Management

The proposed project is located in Smith County, which is not a coastal county. The proposed project is not under the jurisdiction of the Texas Coastal Management Program (TCMP); therefore, the proposed project would not require coordination under the TCMP rules.

III.F.1.g. Essential Fish Habitat

No tidally influenced water bodies exist within the project area. Therefore, no essential fish habitat would be impacted by the proposed project.

III.F.2. Groundwater

III.F.2.a. Aquifers

Smith County is underlain by one major aquifer, the Carrizo-Wilcox Aquifer, and one minor aquifer, the Queen City Aquifer. These aquifers are described in more detail below.

The Carrizo-Wilcox Aquifer is a hydrologically connected system formed by the Wilcox Group and the overlying Carrizo Formation of the Claiborne Group. It extends from the Rio Grande in

south Texas northeastward into Arkansas and Louisiana (Ashworth and Hopkins, 1995). This aquifer is predominantly composed of sand locally imbedded with gravel, silt, clay, and lignite deposited during the Tertiary Period. The aquifer is divided into three distinct formations south of the Trinity River and north of the Colorado River; other portions of the aquifer are not so divided because of the lack of one of these formations. These three formations are the Hooper, Simsboro, and Calvert Bluff. The Simsboro formation typically contains massive water-bearing sands. Wells commonly yield approximately 500 gallons of water per minute, but can exceed this rate under artesian conditions, such as in the Carrizo Sands of the southern part of the aquifer and in the Carrizo and Simsboro formations in the central part of the aquifer. Water from the aquifer is fresh to slightly saline; outcrop areas (areas in which bedrock is exposed) tend to produce hard water that is low in dissolved solids, and downdip areas (defined as areas in the direction of the dip of a stratum or bed) tend to produce softer water with a higher temperature and more dissolved solids. The aquifer is used extensively for irrigation, leading to significant water level declines; water use for lignite surface-mining operations have also contributed to declines (Ashworth and Hopkins, 1995).

The Queen City Aquifer extends in a band across most of the state from the Frio River in south Texas northeastward to Louisiana (Ashworth and Hopkins, 1995). This aquifer is made up of sand, loosely cemented sandstone, and interbedded clay units of the Queen City Formation of the Tertiary Claiborne Group. Total aquifer thickness is usually less than 500 feet, but can approach 700 feet in some areas of northeast Texas. Individual wells typically have low yields, but in some locations, yields can exceed 400 gallons per minute. In general, water quality in the Queen City Aquifer is excellent, but downdip portions of the aquifer can experience a slight decline in quality. Water from the aquifer is uses for municipal, industrial, and agricultural purposes (Ashworth and Hopkins, 1995).

While the recharge zone for the Carrizo-Wilcox Aquifer is outside of the project area, the Queen City Aquifer Outcrop is exposed at the ground surface and subject to recharge along the entirety of the proposed project area (making 100 percent of the proposed project area subject to recharge into the Queen City Aquifer). In addition, due to the sand making up these aquifers, a number of springs and seeps occur within the project area, as discussed below in **Section III.F.2.b**.

III.F.2.b. Springs

Because Smith County is characterized by hilly topography and underlain by sand aquifers, such as those described in **Section III.F.2**, conditions are favorable for the occurrence of springs and seeps. Field studies conducted by Brune (2001) in 1979 identified approximately 31 named springs in the county; this number likely underestimates the true number of springs which occur. Two springs have been documented by Brune as occurring in the vicinity of Lindale: Walnut Springs and Wood Springs.

Walnut Springs is located approximately 2.5 miles west of Lindale. Although a 1960 topographic map indicated that the springs were active, the field visit undertaken by Brune (2001) in 1979 revealed only a seep from Weches sand and the site had been used as a dumping ground. Walnut Springs is located to the west of the Lindale Reliever Route project area and would not be impacted by the proposed project.

Wood Springs is located approximately 3.1 miles south of Lindale adjacent to Prairie Creek in the Wood Springs community (Brune, 2001). This area has several small springs trickling from Weches sand. Wood Springs is located to the east of the Lindale Reliever route project area and would not be impacted by the proposed project.

No springs were identified within the proposed project area during field investigations. One seep was identified within the project area and is discussed in **Section III.G.3**.

III.F.2.c. Wells

In order to assay possible impacts on groundwater, available data from the "located well file" in the Central Records of the Texas Water Development Board (TWDB) were reviewed for the project area. The files disclosed seven recorded water wells in the vicinity of the study corridor. This inventory, however, does not include the entire population of water wells. The characteristics of wells identified in the database are summarized in **Table 25**. The wells denoted within this inventory tap portions of at least two aquifers, including the Carrizo-Wilcox Aquifer and the Queen City Aquifer. Although these wells are in the vicinity of the proposed project, none of these wells are located within project alignments.

Table 25 Characteristics of Recorded Wells

Well Number	Entity/Location	Aquifer	Status
3429501	Colonial Nursery	Carrizo-Wilcox	Drilled in 1959; currently in use for industrial purposes, irrigation.
3429502	Mea Nursery	Queen City	Drilled in 1980; currently unused.
3429801	King #1	Not Applicable	Uses: oil or gas.
3429802	Yarbrough #1	Not Applicable	Uses: oil or gas.
3429803	Gaston #1	Not Applicable	Uses: oil or gas.
3429804	Duck Creek Water Supply Company	Carrizo-Wilcox	Drilled in 1975; currently in use for public supply.
3429805	Duck Creek WSC	Carrizo-Wilcox	Drilled in 2002; currently in use for public supply.

Source: Texas Water Development Board Groundwater Database, accessed March 26, 2009.

III.G. Ecological Resources

III.G.1. Regional Setting

The Lindale Reliever Route project area occurs in an ecotonal transition zone between the Pineywoods and Post Oak Savannah Ecoregions of Texas (Gould et al., 1960; Gould, 1975) (**Figure 10**) and within the South Central Plains Ecoregion more recently mapped by Griffith et al. (2004) and EPA (**Figure 11**). The portions of the county that have not been cleared for agriculture or urban uses are heavily forested by various tree species. The topography of the county ranges from nearly level to steeply sloped. The drainage pattern is well defined, and many streams dissect the county. The northern part of the county drains northeasterly into the Sabine River. The western and southwestern parts drain southwesterly into the Neches River and Lake Palestine, while the eastern and southeastern parts drain southeasterly into West Mud Creek, Mud Creek, and other major streams that flow into the Angelina River.

The Pineywoods covers approximately 15 million acres in east Texas and is characterized by pine and pine-hardwood forests (Correll and Johnston, 1979). The Pineywoods represents the southwestern boundary of the southeastern pine-hardwood forest common throughout most of the southern United States. Numerous streams and rivers are found in the region, and swamps are not uncommon. The widespread availability of water results in a diversified flora and fauna.

The Post Oak Savannah lies directly to the west of the Pineywoods, and comprises approximately 8.5 million acres (Correll and Johnston, 1979). It is characterized by oak-hickory or deciduous forests interspersed with prairies.

The US 69 Lindale Reliever Route project area falls within the Level III U.S. EPA Ecoregion known as the South Central Plains (Griffith et al., 2004). The South Central Plains, known locally as the Piney Woods, is a region of mostly irregular plains that was once dominated by upland oak-hickory-pine forests, but now predominately consists of loblolly pine (*Pinus taeda*) and shortleaf pine (*Pinus echinata*). Within the broader scale Level III Ecoregion lie three major land resource areas, or Level IV Ecoregions: the Tertiary Uplands, the Southern Tertiary Uplands, and the Floodplains and Low Terraces (Griffith et al., 2004). Ecoregions, as defined and described by the EPA, denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. The Tertiary Uplands Ecoregion occupies the entire project area as well as the Tyler and Lindale vicinity. Native dominant species of vegetation include loblolly pine, shortleaf pine, southern red oak (*Quercus falcata*), post oak (*Quercus stellata*), white oak (*Quercus alba*), hickories (*Carya* spp.), and sweetgum (*Liquidambar styraciflua*), and mid and tall grasses such as yellow Indian grass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), longleaf woodoats (*Chasmanthium sessiliflorum*), and panic grasses (*Panicum* spp.) American beautyberry (*Callicarpa americana*),

sumacs (*Rhus* sp.), greenbriars (*Smilax* spp.), and hawthorns (*Crataegus* spp.) are typically part of the understory. Many areas (although not in the Project Area) are replanted to loblolly pine for timber production, or are in improved pasture for cattle. Lumber and pulpwood production, livestock grazing, and poultry production are typical land uses. Oil and gas production is also widespread (Griffith et al., 2004).

III.G.2. Vegetation

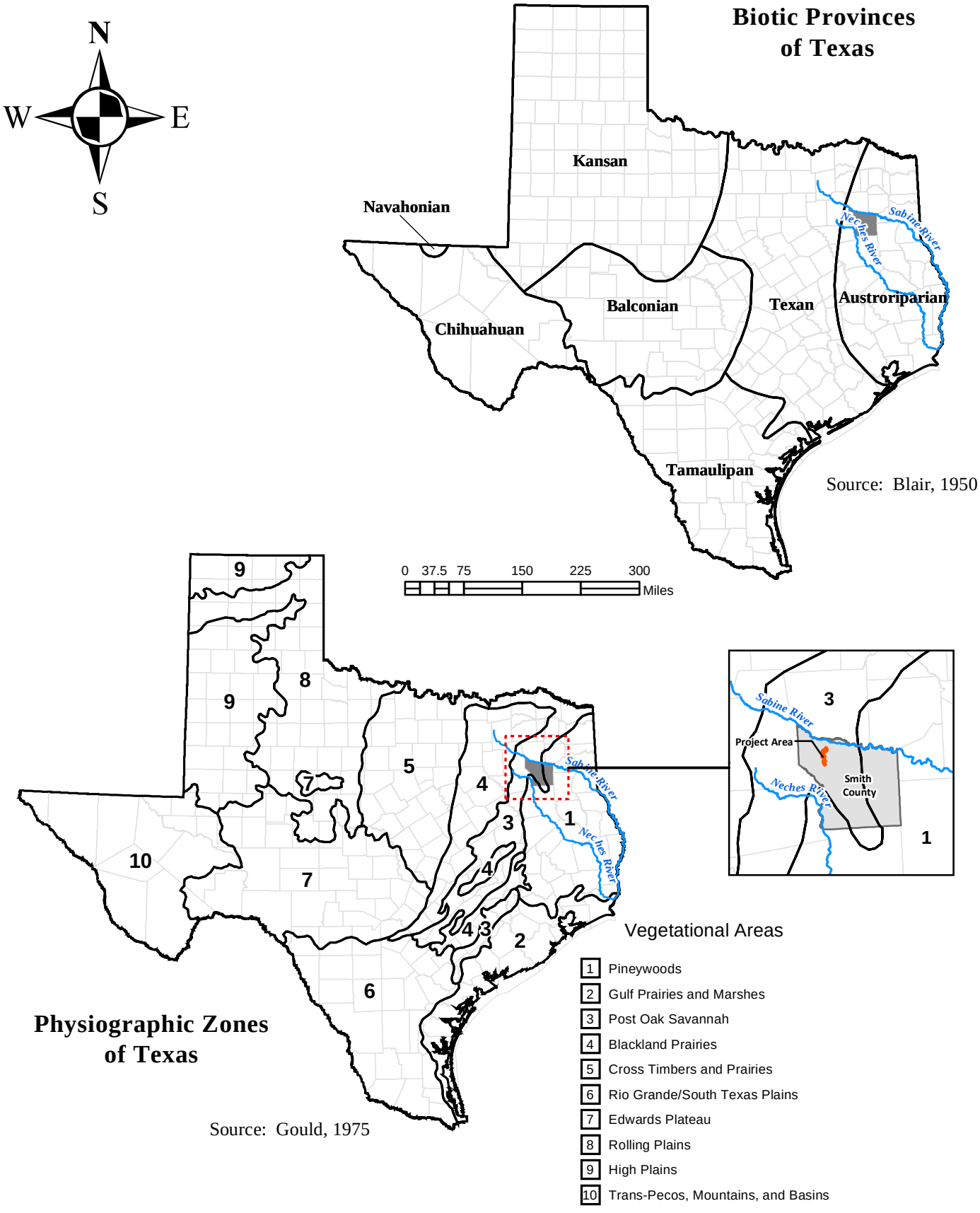
III.G.2.a. Vegetation Areas – General Description

According to "The Vegetation Types of Texas," two vegetation types are mapped for the project area (McMahan et. al, 1984). The majority of the project area is mapped as Other Native or Introduced Grasses, with the western edge of the project area mapped as Post Oak Woods, Forest and Grassland Mosaic.

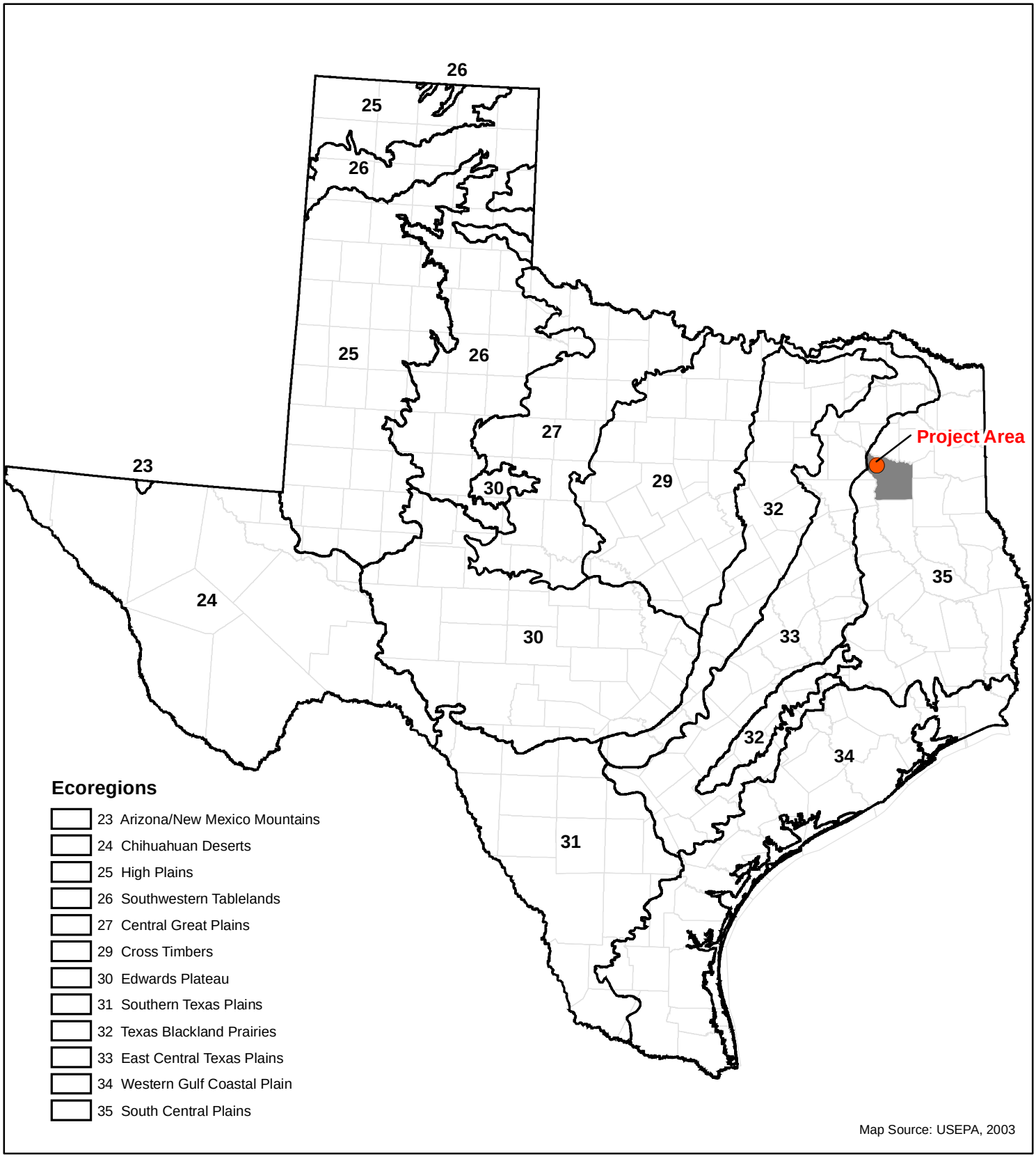
The vegetation type Other Native or Introduced Grasses includes a mixture of native or introduced grasses and forbs on grassland sites or mixed herbaceous communities that result from the clearing of woody vegetation (McMahan et. al, 1984). In northeast and east-central Texas, this vegetation type is associated with the clearing of forests and may portray early stages of the Young Forest vegetation type.

The Post Oak Woods, Forest and Grassland Mosaic vegetation type is commonly found on sandy soils within the Post Oak Savannah Ecoregion. Tree species commonly associated with this vegetation type include post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), live oak (*Q. virginiana*), sandjack oak (*Q. incana*), eastern red cedar (*Juniperus virginiana*), mesquite (*Prosopis glandulosa*), black hickory (*Carya texana*), cedar elm (*Ulmus crassifolia*), and hackberry (*Celtis laevigata*). Other common woody vegetation includes yaupon (*Ilex vomitoria*), poison oak (*Rhus toxicodendron*), American beautyberry (*Callicarpa americana*), hawthorn (*Crataegus spp*.), supplejack (*Berchemia scandens*), trumpet creeper (*Campsis radicans*), dewberry (*Rubus trivialis*), and coral-berry (*Symphoricarpos orbiculatus*). Common herbaceous species include little bluestem (*Schizachyrium scoparium*), silver bluestem (*Bothriochloa saccharoides*), sand lovegrass (*Eragrosis trichodes*), beaked panicum (*Panicum anceps*), three-awn (*Aristida spp*.), sprangle-grass (*Chasmanthium sessiliflorum*), and tickclover (*Desmodium spp*.) (McMahan et al, 1984).

Much of the vegetation of the project area does conform to the mapped type, in that grasslands and upland hardwood forest interspersed with grasslands are found within the project area. In addition to the mapped types, mixed shortleaf pine/hardwood forest is also found within the project area; these correspond to the Pine-Hardwood Forest vegetation type defined by



Vegetational Areas and Biotic Provinces of Texas
Figure 10



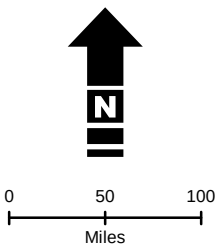


Figure 11

Level III Ecoregions of Texas

McMahan et al. (1984). Vegetative communities observed within the project area are described in the following section.

III.G.2.b. Vegetative Communities Found within the Project Area

In accordance with the TxDOT-TPWD Memorandum of Understanding (MOU) and Memorandum of Agreement (MOA), an investigation was conducted to identify and map the vegetation types present in the project area and assess the potential effects of the proposed project on native vegetation.

A total of five vegetative communities were identified within the project area (see **Potential Environmental Constraints Plates 1-7** in **Appendix A**); these include: upland hardwood forest, pine forest, mixed pine/hardwood forest, riparian forest, and grassland. General descriptions for each of these vegetative communities are found in the following paragraphs. Photographs of project area vegetation are found in **Appendix B**.

Upland hardwood forest is dominated by southern red oak (*Quercus falcata*), post oak, water oak (*Q. nigra*), eastern red cedar (*Juniperus virginiana*), and yaupon (*Ilex vomitoria*). Shortleaf pine (*Pinus echinata*) is sometimes also present, although it typically comprises less than 20 percent of the species composition. Common species found in the understory include Japanese honeysuckle (*Lonicera japonica*), common greenbrier (*Smilax rotundifolia*), Alabama supplejack (*Berchemia scandens*), and twisted leaf yucca (*Yucca rupicola*). The average diameter at breast height (dbh) for trees in this vegetation type ranges from approximately eight to 12 inches. Average height ranges from approximately 40 to 60 feet. Canopy cover is approximately 80 to 85 percent.

The dominant species of the pine forest is shortleaf pine. The average dbh for trees in this vegetation type ranges from approximately eight to 12 inches. Height ranges from approximately 60 to 70 feet. Canopy cover is approximately 80 to 85 percent.

Mixed pine/hardwood forest is dominated by shortleaf pine, southern red oak, post oak, sweetgum (*Liquidambar styraciflua*), and eastern red cedar. Pines typically represent approximately 20 to 40 percent of the tree species composition in this community type. Common species found in the understory include inland sea-oats (*Chasmanthium latifolium*), Japanese honeysuckle, American beautyberry (*Callicarpa americana*), common greenbrier, smooth sumac (*Rhus glabra*), and saplings of the dominant tree species. The average dbh ranges from approximately eight to 12 inches. Height ranges from approximately 60 to 70 feet. Canopy cover is approximately 80 to 85 percent.

Riparian forest is associated with floodplains, creeks, and drainages within the project area. Dominant tree species include sweetgum, water oak, American elm (*Ulmus americana*), Chinaberry (*Melia azedarach*), and sugarberry (*Celtis laevigata*). Species commonly found in the understory include Japanese honeysuckle, switch cane (*Arundinaria gigantea*), common greenbrier, laurel greenbrier (*Smilax laurifolia*), Alabama supplejack, inland sea-oats, and Canada wildrye (*Elymus canadensis*). Average dbh ranges from eight to ten inches. Height ranges from 65 to 75 feet. Canopy cover is approximately 95 percent.

Grasslands within the project area include both tame pasture and native pasture. This vegetation type also includes oldfields, previous croplands or tame pastures which have been allowed to proceed through successional stages. Oldfields commonly show invasive woody growth, and may resemble a savannah. Typical species found in project area grasslands include: bermudagrass (*Cynodon dactylon*), little bluestem (*Schizachyrium scoparium*), vaseygrass (*Paspalum urvillei*), yellow thistle (*Cirsium horridulum*), goldenrod (*Solidago sp*.), storksbill (*Erodium texanum*), southern witchgrass (*Panicum capillare*), bahiagrass (*Paspalum notatum*), Japanese honeysuckle, Louisiana cupgrass (*Eriochloa punctata*), knotroot bristlegrass (*Setaria geniculata*), Louisiana blackberry (*Rubus louisianus*), dewberry (*Rubus trivialis*), twisted leaf yucca, prickly pear (*Opuntia sp*.), and sotol (*Dasylirion texanum*).

III.G.2.c Unusual Vegetation and Special Habitat Features

In accordance with the TxDOT- TPWD MOA, any unusual vegetation features or special habitat features occurring within the project area were identified and described. Unusual vegetation features are described in the MOA as including:

- Unmaintained vegetation,
- Trees or shrubs along a fenceline adjacent to a field (fencerow vegetation),
- Riparian vegetation (particularly where fields/cropland extends up to or abuts the vegetation associated with the riparian corridor),
- Trees that are unusually larger than other trees in the area, and
- Unusual stands or islands (isolated) of vegetation.

Unusual vegetation features identified within the proposed project area include fencerow vegetation and riparian vegetation. A description of riparian vegetation within the project area is provided above. Vegetation occurring along fencelines within the project area includes species such as common greenbrier, Japanese honeysuckle, eastern red cedar, water oak, post oak, and southern red oak. The dbh for trees and shrubs growing along fencelines typically ranges from approximately two to eight inches. Height ranges from approximately ten to 25 feet.

Special habitat features are described in the TxDOT-TPWD MOA as including:

- Bottomland hardwoods,

- Caves,
- Cliffs and bluffs,
- Native prairies (particularly those with climax species of native grasses and forbs),
- Ponds (temporary and permanent, natural, and man-made),
- Seeps or springs,
- Snags (dead trees) or groups of snags,
- Water bodies (creeks, streams, rivers, lakes, etc.), and
- Existing bridges with known or easily observed bird or bat colonies.

Special habitat features within the proposed right-of-way include ponds, seeps, and water bodies (creeks). Three ponds would be impacted by the proposed project. Five wetlands, one seep, and nine streams occur within the project area and would be crossed by one or both project alternatives. Impacts to project area wetlands and streams are discussed in detail in the following section.

III.G.3. Waters of the U.S., Including Wetlands

Wetlands are transitional areas between terrestrial and aquatic ecological systems. Many wetlands are protected under the Clean Water Act, and are regulated by the U.S. Army Corps of Engineers (USACE). The 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987) defines wetlands based on three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology. In general, all three criteria must be present for an area to qualify as a wetland. Some exceptions occur in disturbed areas or in newly formed wetlands, where one indicator (such as hydric soils) might be lacking. These areas are dealt with on an individual basis as outlined in the Field Guide for Wetland Delineation.

In addition to the jurisdictional wetlands defined above, the Clean Water Act regulates impacts to other waters of the United States. The term “waters of the United States” has broad meaning and incorporates both deepwater aquatic habitats and special aquatic sites, including wetlands, as listed below:

- The territorial seas with respect to the discharge of fill material.
- Coastal and inland waters, lakes, rivers, and streams that are navigable waters of the United States, including their adjacent wetlands.
- Tributaries to navigable waters of the United States, including adjacent wetlands.
- Interstate waters and their tributaries, including adjacent wetlands.

All other waters of the United States not identified above, such as intermittent streams, prairie potholes, and other waters that are not a part of a tributary system to interstate waters or navigable waters of the United States, the degradation or destruction of which could affect interstate commerce.

Note that a 2006 Supreme Court decision (Rapanos v. U.S.) has determined that isolated wetlands are currently outside of the USACE's jurisdiction.

Waters of the U.S., including wetlands, may provide and/or promote the following functions: groundwater recharge, groundwater discharge, nutrient removal and/or transformation, production export, and the promotion of habitat and wildlife diversity and abundance. Waters of the U.S. are also valued for their recreational uses and uniqueness as ecological and physiographic zones.

According to 2013 National Hydrography Dataset (NHD) information, there are seven mapped streams in the project area. Their names and lengths in the project area are: Stevenson Branch (11.3 miles); Davis Branch (6.5 miles); Prairie Creek (4.4 miles); Duck Creek (3.3 miles); Hubbard Branch (3.2 miles); Long Brake Creek (1.7 miles); and Macs Creek (1.1 miles). The project area tends to have adjacent wetlands and/or impounded areas associated with these major creeks. Within the project area, the following creeks and their impounded acreages are listed: Stevenson Branch (48.1 acres); Davis Branch (47.2 acres); Prairie Creek (5.1 acres); Long Brake Creek (3.9 acres); Duck Creek (2.0 acres); Hubbard Branch (0.8 acre); and, Macs Creek (0.3 acre). There are 64 ponds or stock tanks of varying size in the project area (NHD, 2013).

Field wetland determinations were completed in the project area in January and February 2008. A total of ten single and complete crossings of waters of the U.S., including six wetlands, were identified within the project area (**Table 26**). Waters of the U.S. include all of the creek, branch, and other jurisdictional drainage crossings encountered during the field delineation. Wetland determination data forms were filled out for each wetland and water of the U.S. crossing in order to describe the dominant vegetative species observed at each site, along with specific hydrologic and soil characteristics (see Appendix C). The location of each water of the U.S. crossing is depicted on **Potential Environmental Constraints Plates 1-7** in **Appendix A**. Each of these water of the U.S. crossings is described below, beginning at the northernmost and moving south.

Table 26 Jurisdictional Waters Within Project Area

Single and Complete Crossing Number*	Alternative	Name of Feature	Type of Feature
1	D	Stevenson Branch	Stream
			Adjacent Wetland A
2	G	Stevenson Branch	Adjacent Wetland B (north of stream)
			Stream
			Adjacent Wetland C (south of stream)
3	G	Seep	Seep
4	D	Tributary to Duck Creek	Stream
5	G	Tributary to Duck Creek	Stream
6	Both	Davis Branch	Stream
			Adjacent Wetland D

Table 26 Jurisdictional Waters Within Project Area (continued)			
Single and Complete Crossing Number*	**Alternative**	**Name of Feature**	**Type of Feature**
7	Both	Tributary to Davis Branch	Stream (main channel)
			Stream (branch)
			Adjacent Wetland E (at branch)
8	Both	Tributary to Davis Branch	Stream
			Adjacent Wetland F
9	Both	Tributary to Prairie Creek	Stream
10	Both	Tributary to Long Brake Creek	Stream (branch to west)
			Stream (main branch to east)

*Water feature number corresponds to **Potential Environmental Constraints Plates 1–7** in **Appendix A**.

Crossing 1 – This crossing consists of Stevenson Branch and an adjacent wetland, both of which are crossed by Alternative D. Stevenson Branch exhibits an average ordinary high water mark (OHWM) of approximately 10 feet. The adjacent forested wetland (Wetland A) is located to the south of the stream. This wetland is located within the 100-year floodplain. The area is mapped by the NRCS as Keechi loam, frequently flooded. It is poorly drained and is listed as a hydric soil. The stream is depicted on U.S. Geological Survey (USGS) topographic maps as a perennial stream and the wetland is shown on USFWS National Wetland Inventory (NWI) maps as perennial, forested/scrub-shrub, broad-leaved deciduous, and seasonal. Vegetation observed at Crossing 1 and the adjacent wetland includes water oak, American elm, sweet gum, Florida maple (*Acer barbatum*), switch cane, soft rush (*Juncus effusus*), goldenrod, Japanese honeysuckle, and common greenbrier.

Crossing 2 – This crossing consists of Stevenson Branch and two adjacent wetlands that are crossed by Alternative G. Stevenson Branch exhibits an average OHWM of approximately 10 feet. The stream is depicted on USGS topographic maps as a perennial stream and on NWI maps as perennial, forested, broad-leaved deciduous, and seasonal. Vegetation observed at Crossing 2 includes American elm, sugarberry, water oak, common greenbrier, Japanese honeysuckle, inland sea-oats, and Canada wildrye.

Wetland B is an adjacent emergent wetland that is located in the 100-year floodplain just north of Stevenson Branch. This wetland is depicted as a wetland on USGS topographic maps, and is shown on NWI maps as perennial, scrub-shrub, broad-leaved deciduous, and seasonal. The area is mapped by the NRCS as Keechi loam, frequently flooded. It is poorly drained and is listed as a hydric soil. Vegetation observed at Wetland B includes pecan (*Carya illinoiensis*), American elm, soft rush, yellow thistle, Small's spike rush (*Eleocharis smallii*), swamp smartweed (*Polygonum hydropiperoides*), manyflower marsh pennywort (*Hydrocotyle umbellata*), goldenrod, vaseygrass, storksbill, southern witchgrass, bahiagrass, bermudagrass, sedge (*Carex sp.*), dewberry, Louisiana cupgrass, knotroot bristlegrass, and little bluestem.

A second adjacent emergent wetland (Wetland C) is also located in the 100-year floodplain but south of Stevenson Branch. The wetland is depicted as a wetland on USGS topographic maps, and is shown on NWI maps as perennial, scrub-shrub, broad-leaved deciduous, and seasonal. The area is mapped by the NRCS as Keechi loam, frequently flooded. It is poorly drained and is listed as a hydric soil. Vegetation observed at Wetland C includes bahiagrass, Louisiana blackberry, bermudagrass, vaseygrass, soft rush, yellow thistle, dewberry, knotroot bristlegrass, swamp smartweed, switchgrass (*Panicum virgatum*), manyflower marsh pennywort, southern witchgrass, and common buttonbush (*Cephalanthus occidentalis*).

Crossing 3 – Crossing 3 is a seep that would be crossed by Alternative G. This seep is outside the 100-year floodplain and lies south of Stevenson Branch. It is not shown on USGS topographic maps or NWI maps. The seep is in a forested area at the bottom of a hill. Water is pooled in the area, and no vegetation was observed within it. The area is mapped by the NRCS as Elrose fine sandy loam, 3-8 percent slopes. It is well drained and is not listed as a hydric soil. Vegetation observed adjacent to the seep includes American elm, water oak, American holly (*Ilex opaca*), sweetgum, southern red oak, common greenbrier, eastern red cedar, and Japanese honeysuckle. The water from the seep runs toward Stevenson Branch, eventually reentering the ground.

Crossing 4 – This unnamed tributary to Duck Creek would be crossed by Alternative D. The average OHWM of the stream is approximately four feet. It is depicted on USGS topographic maps as a perennial stream and on NWI maps as perennial, forested, broad-leaved deciduous, and temporary. The area is mapped by the NRCS as Elrose fine sandy loam, 3-8 percent slopes. It is well drained and is not listed as a hydric soil. Vegetation observed at Crossing 4 includes water oak, eastern red cedar, Japanese honeysuckle, common greenbrier, and Alabama supplejack.

Crossing 5 – This crossing is the same unnamed tributary to Duck Creek as Crossing 4. However, this is the location where it would be crossed by Alternative G. The average OHWM of the stream is approximately six feet at this location. It is depicted on USGS topographic maps as a perennial stream and on NWI maps as perennial, forested, broad-leaved deciduous, and temporary. The area is mapped by the NRCS as Elrose fine sandy loam, 3-8 percent slopes. It is well drained and is not listed as a hydric soil. Vegetation observed at Crossing 5 includes water oak, southern red oak, eastern red cedar, and common greenbrier.

Crossing 6 – This crossing is located where Davis Branch and an adjacent wetland (Wetland D) would be crossed by both alternatives. The average OHWM of the stream is approximately 14 feet. It is shown as a perennial stream on USGS topographic maps and as perennial, forested, broad-leaved deciduous, and temporary on NWI maps. Wetland D is a forested wetland located

adjacent to the Davis Branch. The wetland is not shown on USGS topographic maps but is depicted as perennial, forested, broad-leaved deciduous, and temporary on NWI maps. The area is mapped by the NRCS as Owentown loamy fine sand, occasionally flooded. It is moderately well drained and is listed as a hydric soil. Vegetation observed at Crossing 6 and the adjacent wetland includes river birch (*Betula nigra*), sweetgum, shortleaf pine, loblolly pine (*Pinus taeda*), black tupelo (*Nyssa sylvatica*), red maple (*Acer rubrum*), winged elm (*Ulmus alata*), southern waxmyrtle (*Myrica cerifera*), American holly, yaupon, common greenbrier, Japanese honeysuckle, soft rush, yellow thistle, and sedge (*Cyperus sp.*).

Crossing 7 – This crossing is an unnamed tributary to Davis Branch that would be crossed by both alternatives. The stream has two branches. The main branch exhibits an OHWM of approximately 12 feet, and the smaller branch exhibits an OHWM of approximately three feet. A forested wetland (Wetland E) is located adjacent to the smaller branch of the tributary. The larger tributary is shown on USGS topographic maps as an intermittent stream, and is not shown on NWI maps. The wetland is not depicted on USGS topographic maps or NWI maps. The area of the larger tributary is mapped by the NRCS as Owentown loamy fine sand, occasionally flooded. It is moderately well drained and is listed as a hydric soil. The area of the smaller tributary, and Wetland E, is mapped by the NRCS as Pickton loamy fine sand, 8-15 percent slopes. It is well drained and is not listed as a hydric soil. Vegetation observed at Crossing 7 includes sweetgum, river birch, black willow (*Salix nigra*), southern waxmyrtle, water oak, red maple, spring herald (*Forestiera pubescens*), common buttonbush, common greenbrier, Japanese honeysuckle, and poison ivy (*Toxicodendron radicans*).

Crossing 8 – Both alternatives cross this unnamed tributary to Davis Branch. The stream exhibits an average OHWM of approximately three feet. An adjacent forested wetland (Wetland F) is found on both sides of the stream. The tributary is shown on USGS topographic maps as an intermittent stream, and is not shown on NWI maps. The wetland is not depicted on USGS topographic maps or NWI maps. The area is mapped by the NRCS as Pickton loamy fine sand, 8-15 percent slopes. It is well drained and is not listed as a hydric soil. Vegetation observed at Crossing 7 and the adjacent wetland includes sweetgum, river birch, southern waxmyrtle, common greenbrier, Japanese honeysuckle, and common buttonbush.

Crossing 9 – This is an unnamed tributary to Prairie Creek that would be crossed by both alternatives. The average OHWM is approximately six feet. The tributary is shown on USGS topographic maps as an intermittent stream and on NWI maps as perennial, forested, broad-leaved deciduous, and temporary. The area is mapped by the NRCS as Wolfpen loamy fine sand, 8-15 percent slopes. It is well drained and is not listed as a hydric soil. Vegetation observed at Crossing 9 includes southern red oak, sweetgum, eastern red cedar, Japanese honeysuckle, and common greenbrier.

Crossing 10 – This is an unnamed tributary to Long Brake Creek that would be crossed by both alternatives. The tributary has three branches. The westernmost branch exhibits an average OHWM of approximately six feet. The main branch to the east exhibits an average OHWM of approximately four feet. These two branches come together just north of the culvert extending underneath the existing IH 20 roadway. The third branch extends eastward from the main branch, and is located just outside of the proposed right-of-way. The average OHWM of this branch is approximately three feet. The westernmost branch is depicted on USGS topographic maps as an intermittent stream; the other two branches are not shown. All three branches are shown on NWI maps as perennial, forested, broad-leaved deciduous, and temporary. The area is mapped by the NRCS as Oakwood fine sandy loam, 5-8 percent slopes. It is moderately well drained and is not listed as a hydric soil. Vegetation observed at Crossing 10 includes water oak, eastern red cedar, sweetgum, Japanese honeysuckle, common greenbrier, and inland sea-oats.

III.G.4. Wildlife Resources

The Lindale Reliever Route project area falls into a historical transitional zone between the Texan (to the west) and Austroriparian (to the east) biotic provinces delineated by Blair (1950) (see **Figure 10**). Blair stratified broad biogeographical sections of Texas based upon communities of indigenous vertebrates. One of the key factors influencing the habitation of an area by wildlife species is vegetation. Since the Austroriparian province is a western extension of the forests of the southeastern U.S., much of the wildlife common to the province is also found throughout the southeastern U.S. To the west of the Austroriparian, the Texan province functions as an ecotone between the eastern forests and western habitats of the Kansas, Balconian, and Tamaulipan provinces. The Texan biotic province had no true endemic vertebrate species. In this area, western species tended to encroached into open habitats and eastern species encroach along the many wooded drainages extending through the landscape (Blair, 1950). Today, the historic distribution of wildlife species within the biotic provinces delineated by Blair in 1950 has been substantially influenced by sixty-three years of land use changes. The combined effects of timber clearing, agricultural development, livestock grazing, reservoir construction, lignite mining, urbanization, road development, and introduction of non-native exotic grassland and other vegetation species have severely altered the distribution and abundance of wildlife species.

According to records compiled by Davis and Schmidly (1997), the number of mammal species that could potentially occur within the vicinity of the study area is about fifty. Many species that are common to bottomland hardwood riparian ecosystems such as swamp rabbit (*Sylvilagus aquaticus*), eastern gray squirrel (*Sciurus carolinensis*), river otter (*Lutra canadensis*), and mink (*Mustela vison*) have declined from habitat modification and loss. Species that have been extirpated from the area include the black bear (*Ursus americanus*), and red wolf (*Canis rufus*).

Typical mammal species expected within the project area include the white-tailed deer (*Odocoileus virginianus*), common raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), eastern mole (*Scalopus aquaticus*), fox squirrel (*Sciurus niger*), Baird's pocket gopher (*Geomys breviceps*), fulvous harvest mouse (*Reithrodontomys fulvescens*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), eastern cottontail rabbit (*Sylvilagus floridanus*), and swamp rabbit (*S. aquaticus*) Mammals typical of grasslands in the project area include the deer mouse (*Peromyscus maniculatus*), eastern red bat (*Lasiurus borealis*), and long-tailed weasel (*Mustela frenata*) (Davis and Schmidly, 1997).

Snakes common to the area include the eastern yellowbelly racer (*Coluber constrictor priapus*), Texas rat snake (*Elaphe obsoleta lindheimeri*), speckled kingsnake (*Lampropeltis getulus holbrooki*), diamondback watersnake (*Nerodia rhombifera*), copperhead (*Agkistrodon contortrix*), cottonmouth (*Agkistrodon piscivorous*), and timber rattlesnake (*Crotalus horridus*). Lizards found in the Texan and Austroriparian are the green anole (*Anolis carolinensis*), Western slender glass lizard (*Ophiosauus attenuatus*), fence lizard (*Sceloporus undulatus*), and ground skink (*Scincella lateralis*). Only two land turtle species would be expected in the project area, the ornate and three-toed box turtles (*Terrapene ornata* and *T. carolina*, respectively).

Typical anuran species that may occur in the project area are the Hurter's spadefoot (*Scaphiopus holbrookii hurteri*), Gulf Coast toad (*Bufo valliceps*), Woodhouse's toad (*Bufo woodhousii*), gray treefrog (*Hyla versicolor/chrysoscelis*), green treefrog (*Hyla cinerea*), bullfrog (*Rana catesbiana*), southern leopard frog (*Rana sphenocephala*), and eastern narrowmouth toad (*Microhyla carolinensis*).

Salamanders that may occur in the project area include the smallmouth salamander (*Ambystoma texanum*), the eastern tiger salamander (*Ambystoma tigrinum*), and the lesser siren (*Siren intermedia*).

The varying habitats of the Lindale area provide refuge for many resident and migrant species of birds. The nearby Gus Engeling Wildlife Management Area in Anderson County has documented approximately 156 avian species occurrences (TPWD, 2007). Approximately 353 species of birds have been documented as occurring in the Pineywoods Ecoregion of Texas, accounting for 57 percent of the species documented in the state (Wolf et. al, 2001), and the Oak Woods and Prairies Ecoregion has a total of approximately 471 documented bird species occurrences (Freeman, 2003). The project area supports substantial amounts of wooded and grassland avian habitat. Typical year-round residents include the Great Blue Heron (*Ardea herodias*), Great Egret (*A. alba*), Wood Duck (*Aix sponsa*), Black Vulture (*Coragyps atratus*), Turkey Vulture (*Cathartes aura*), Red-shouldered Hawk (*Buteo lineatus*), Red-tailed Hawk (*B. jamaicensis*), Northern Bobwhite (*Colinus virginianus*), Eastern Wild Turkey (*Meleagris gallopavo silvrstris*), Killdeer (*Charadrius vociferus*), Rock Dove (*Columba livia*), Mourning

Dove (*Zenaida macroura*), Barred Owl (*Strix varia*), Great Horned Owl (*Bubo virginianus*), Eastern Screech Owl (*Megascops asio*), Downy Woodpecker (*Picoides pubescens*), Pileated Woodpecker (*Drycopus pileatus*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Red-bellied Woodpecker (*M. carolinus*), American Crow (*Corvus brachyrhynchos*), Blue Jay (*Cyanocitta cristata*), Carolina Chickadee (*Poecile carolinensis*), Tufted Titmouse (*Baeolophus ridgmayi*), Carolina Wren (*Thryothorus ludovicianus*), Brown-headed Nuthatch (*Sitta pusilla*), Eastern Bluebird (*Sialia sialis*), Northern Mockingbird (*Mimus polyglottos*), American Robin (*Turdus migratorius*), Loggerhead Shrike (*Lanius ludocivianus*), European Starling (*Sturnus vulgaris*), Pine Warbler (*Dendroica pinus*), Northern Cardinal (*Cardinalis cardinalis*), Chipping Sparrow (*Spizella passerina*), Red-winged Blackbird (*Agelaius phoeniceus*), Brown-headed Cowbird (*Molothrus ater*), Common Grackle (*Quiscalus quiscula*), Eastern Meadowlark (*Sturnella magna*), House Finch (*Carpodacus mexicanus*), and House Sparrow (*Passer domesticus*) (Shackelford and Lockwood, 2000; Wolf et. al, 2001; Freeman, 2003).

III.G.5. Rare, Threatened and Endangered Species

III.G.5.a. Species of Potential Occurrence in Smith County

TPWD's Texas Natural Diversity Database (TxNDD) documents observations and locations of tracked rare, threatened or endangered species and assemblages throughout the state. The TxNDD was searched for Element of Occurrence Records (EORs) to determine if any reports of species have occurred within a 1.5 mile radius of the proposed project (see **Table 27**).

Table 27 Texas Natural Diversity Database Search Results

EO ID[1]	Scientific Name	Common Name
1612	*Symphyotrichum puniceum var. scabricaule*	Rough-stem aster

[1]EO ID = Element of Occurrence Record Identification Number for species observed.
TPWD TxNDD was searched June 8, 2009, utilizing an approximate 1.5-mile radius of the proposed project.

One occurrence of the rare rough-stem aster (*Symphyotrichum puniceum var scabricaule*) was recorded within 1.5 miles of the proposed project area in 1995. This occurrence was recorded approximately 0.8 mile east of the project area, 0.5 mile south of the intersection of County Road 431 and County Road 4118. This species is not federally or state-listed as threatened or endangered. Habitat for the rough-stem aster is defined as relatively open, unshaded sites in saturated soils associated with seepage areas, bogs, marshes, ponds, drainages, and degraded wetland remnants on the Queen City, Carrizo, and Sparta sand formations. This species was formerly thought to be limited in range to the post oak belt in Texas but is now known to occur in three other southeastern states (Poole et al., 2007). Suitable habitat for the rough-stem aster occurs in the project area, although there were no specimens observed during field investigations.

Databases of sensitive species maintained by the USFWS and TPWD identified six federally listed threatened, endangered, or candidate species that may occur or have historically occurred in Smith County, including three birds, two mammals, and one reptile. These species are the Louisiana pine snake (*Pituophis ruthveni*), Interior Least Tern (*Sterna antillarum athalassos*), Piping Plover (*Charadrius melodus*), Sprague's pipit (*Anthus spragueii*), Louisiana black bear (*Ursus americanus luteolus*), and red wolf (*Canis rufus*). Seventeen state-listed species that are not federally listed, including five mollusks, three fish, four reptiles, four birds, and one mammal, could potentially occur in Smith County. These species are the Louisiana pigtoe (*Pleurobema riddellii*), sandbank pocketbook (*Lampsilis satura*), southern hickorynut (*Obovaria jacksoniana*), Texas heelsplitter (*Potamilus amphichaenus*), Texas pigtoe (*Fusconaia askewi*), blackside darter (*Percina maculata*), creek chubsucker (*Erimyzon oblongus*), paddlefish (*Polyodon spathula*), alligator snapping turtle (*Macrochelys temminckii*), northern scarlet snake (*Cemophora coccinea copei*), Texas horned lizard (*Phrynosoma cornutum*), timber/canebrake rattlesnake (*Crotalus horridus*), American Peregrine Falcon (*Falco peregrinus anatum*), Bachman's Sparrow (*Aimophila aestivalis*), Bald Eagle (*Haliaeetus leucocephalus*), Wood Stork (*Mycteria americana*), and black bear (*Ursus americanus*). It should be noted that the official federal status of the Bald Eagle is "Delisted, Monitoring," which is a different (and more complex) status than "state-listed only." In addition, it should be noted that the two databases differ with regards to what species might occur in Smith County. The database of species of potential occurrence in Smith County maintained by the USFWS includes only the Bald Eagle (*Haliaeetus leucocephalus*) and Louisiana black bear (*Ursus americanus luteolus*). **Table 28** presents the federally and state-listed threatened and endangered species, that could occur within Smith County. **Table 28** also lists species with no regulatory status that are considered rare in Texas and could occur within Smith County. The current status and habitat requirements for each of the species are also included.

No evidence of any of the species listed in **Table 28** was observed during field investigations.

Table 28 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present?
Carrizo leather flower *Clematis carrizoensis*	NL	NL	Deep sandy soils; prairie areas of oak-hickory woodlands	Yes
Panicled indigobush *Amorpha paniculata*	NL	NL	Acid seep forests, peat bogs, wet floodplain forests and seasonal wetlands on the edge of saline prairies in east Texas.	Yes
Rough-stem aster *Symphyotrichum puniceum var scabricaule*	NL	NL	Relatively open sites in saturated soils associated with seepage areas, bogs, marshes, ponds, drainages, and degraded wetlands remnants on the Queen City, Carrizo, and Sparta sand formations	Yes
Shinner's sunflower *Helianthus occidentalis ssp plantagineus*	NL	NL	Mostly on prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country	Yes

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Table 28 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)				
Species	**Federal Status**	**State Status**	**Description of Suitable Habitat**	**Habitat Present?**
Texas trillium *Trillium texanum*	NL	NL	In or along the margins of hardwood forests on wet acid soils of bottoms and lower slopes, strongly associated with forested seeps and baygalls	Yes
Creeper (squawfoot) *Strophitus undulatus*	NL	NL	Small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins	No
Fawnsfoot *Truncilla donaciformis*	NL	NL	Small to large rivers especially on sand, mud, rocky mud, and sand and gravel, also silt and cobble bottoms in still to swiftly flowing waters; Red (historic), Cypress (historic), Sabine (historic), Neches, Trinity, and San Jacinto River basins	No
Little spectacle case *Villosa lienosa*	NL	NL	Creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along the banks in slower currents; east Texas, Cypress through San Jacinto River basins	Yes
Louisiana pigtoe *Pleurobema riddellii*	NL	T	Streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins	Yes
Sandbank pocketbook *Lampsilis satura*	NL	T	Small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfer through San Jacinto River basins; Neches River	No
Southern hickorynut *Obovaria jacksoniana*	NL	T	Medium sized gravel substrates with low to moderate current; Neches, Sabine, and Trinity River basins	No
Texas heelsplitter *Potamilus amphichaenus*	NL	T	Quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins	Yes
Texas pigtoe *Fusconaia askewi*	NL	T	Rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sabine through Trinity Rivers as well as San Jacinto River	No
Wabash pigtoe *Fusconaia flava*	NL	NL	Creeks to large rivers on mud, sand, and gravel from all habitats except deep shifting sands; found in moderate to swift currents; east Texas River basins, Red through San Jacinto; elsewhere occurs in reservoirs and lakes with no flow	Yes
Wartyback *Quadrula nodulata*	NL	NL	Gravel and sand-gravel bottoms in medium to large rivers and on mud; Red, Sabine, Neches River basins	No
Blackside darter *Percina maculata*	NL	T	Red, Cypress, and Sulfur River basins; clear, gravelly streams; prefers pools with some current, or even quiet pools, to swift riffles	No
Creek chubsucker *Erimyzon oblongus*	NL	T	Found in tributaries of the Red, Sabine, Neches, Trinity, and San Jacinto Rivers, seldom in impoundments; prefers headwaters, but seldom in springs; young typically in headwater rivulets or marshes; spawns in river mouths or pools, riffles, lake outlets, upstream creeks	Yes

Table 28 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)				
Species	**Federal Status**	**State Status**	**Description of Suitable Habitat**	**Habitat Present?**
Ironcolor shiner *Notropis chalybaeus*	NL	NL	Big Cypress Bayou and Sabine River basins; pools and slow runs of low gradient small acidic streams with sandy substrate and clear well vegetated water	Yes
Orangebelly darter *Etheostoma radiosum*	NL	NL	Red through Angelina River basins; just headwaters ranging from high gradient streams to more sluggish lowland streams, gravel and rubble riffles preferred	Yes
Paddlefish *Polyodon spathula*	NL	T	Prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites; spawn in fast, shallow waters over gravel bars; larvae may drift from reservoir to reservoir	No
Western sand darter *Ammocrypta clara*	NL	NL	Red and Sabine River basins; clear to slightly turbid water of medium to large rivers that have moderate to swift currents, primarily over extensive areas of sandy substrate	No
Alligator snapping turtle *Macrochelys temminckii*	NL	T	Inhabits deep waters of rivers, canals, lakes, oxbows, swamps, bayous, ponds near deep running water; may migrate several miles along rivers; active March to October and breeds April to October	Yes
Louisiana pine snake *Pituophis ruthveni*	C	T	Mixed deciduous-longleaf pine forests; breeds April to September	No
Northern scarlet snake *Cemophora coccinea copei*	NL	T	Mixed hardwood scrub on sandy soils, feeds on reptile eggs, semi-fossorial, active April to September	Yes
Sabine map turtle *Graptemys ouachitensis sabinensis*	NL	NL	Sabine River system; rivers and related tributaries, ponds and reservoirs with abundant aquatic vegetation; basks on fallen logs and exposed roots	Yes
Texas horned lizard *Phrynosoma cornutum*	NL	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; sandy to rocky soil	Yes
Timber/Canebrake rattlesnake *Crotalus horridus*	NL	T	Swamps, floodplains, upland pine and deciduous forests, riparian zones, abandoned farmland, limestone bluffs; sandy soil or black clay; prefers dense ground cover	Yes
American Peregrine Falcon *Falco peregrinus anatum*	DL	T	Nests in tall cliff eyries in west Texas; migrant across state from more northern breeding areas in U.S. and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban	No
Arctic Peregrine Falcon *Falco peregrinus tundrius*	DL	NL	Nests in tundra regions; migrates through Texas; winter inhabitant of coastlines and mountains from Florida to South America. Occupies wide range of habitats during migration, including urban; stopovers at leading landscape edges, usually near water	No
Bachman's Sparrow *Aimophila aestivalis*	NL	T	Open pine woods with scattered bushes or understory, on brushy or overgrown hillsides, overgrown fields with thickets and brambles, nests on ground against grass tuft or under low shrubs.	Yes
Bald Eagle* *Haliaeetus leucocephalus*	DL,M	T	Nests and winters near rivers, lakes and along coasts; nests in tall trees or on cliffs near large bodies of water	No

Table 28 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present?
Sprague's Pipit *Anthus spragueii*	C	NL	Wintering migrant in TX; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size, avoids edges	No
Henslow's Sparrow *Ammodramus henslowii*	NL	NL	Wintering individuals found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking	Yes
Interior Least Tern *Sterna antillarum athalassos*	E	E	Nests along sand and gravel bars within braided streams and rivers; also known to nest in man-made structures	No
Piping Plover *Charadrius melodus*	T	T	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats	No
Wood Stork *Mycteria americana*	NL	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds; breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960	Yes
Black bear *Ursus americanus*	T/SA; NL	T	Inhabits bottomland hardwoods and large tracts of undeveloped forested areas, in Texas will inhabit desert lowlands and high elevation forests and forests, dens in tree hollows, rock piles, cliff overhangs, caves, or underbrush piles. Due to field characteristics similar to Louisiana Black Bear, treat all east Texas black bears as federal and state-listed threatened	No
Louisiana black bear* *Ursus americanus luteolus*	T	T	Large relatively remote blocks of land. They typically inhabit bottomland hardwood forests but also utilize brackish and freshwater marshes, salt domes, wooded spoil levees along canals and bayous, and agricultural fields	No
Plains spotted skunk *Spilogale putorius interrupta*	NL	NL	Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie	Yes
Red wolf *Canis rufus*	E	E	Formerly known throughout the eastern half of Texas in brushy and forested areas, as well as coastal prairies	No
Southeastern myotis bat *Myotis austroriparius*	NL	NL	Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures	Yes

E – Endangered
T - Threatened
C –Candidate for Listing
DL – Delisted; DL, M – Delisted, Monitoring
T/SA - Threatened by Similarity of Appearance
NL - Not Listed; rare, but with no current regulatory protection
*These species occur on the U.S. Fish and Wildlife list of species potentially occurring in Smith County; all other species listed in this table are from the Texas Parks and Wildlife List of species of potential occurrence in Smith County

Sources:
Texas Parks and Wildlife Department. Annotated County Lists of Rare Species. Smith County (last revision 8/7/2012). Rare, Threatened, and Endangered Species of Texas http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx, accessed April 8, 2013.
U.S. Fish and Wildlife Service. Endangered Species List. List of Species by County for Texas: Smith County. Smith County (last revision 3/19/2013). http://www.fws.gov/southwest/es/ES_ListSpecies.cfm, accessed April 8, 2013.

III.G.5.b. Federally Listed and Candidate Species

Six federally protected or candidate species were identified as potentially occurring within Smith County, including three birds, two mammals, and one reptile. Each of these species is discussed in detail below.

The Interior Least Tern (*Sterna antillarum athalassos*) is federally listed as endangered, and is only classified as endangered when found inland, away from the coast. The species is migratory, wintering along the coasts of Central and South America and breeding along inland river systems in the United States. In Texas, they are found along the Rio Grande, Canadian River, and Red River (Campbell, 1995). The main threat to the species is habitat destruction, often resulting from channelization, irrigation, and construction of reservoirs. Disruption of historical flood regimes, water pollution, and human recreational activities on sandbars used for nesting also pose threats to the species (Campbell, 1995). This species is not known to occur in the vicinity of the project area, and project area streams do not provide appropriate nesting habitat for the interior least tern. This species could migrate through the project area; however, because preferred habitat for the species is not present, any use of the project area would be considered very unlikely.

The Piping Plover (*Charadrius melodus*) is federally listed as threatened. The species is a wintering migrant along the Texas Gulf Coast, utilizing beaches and sparsely vegetated tidal mudflats, sandflats, or algal flats as feeding areas and roosting nearby on beaches or among debris washed up by the tide (Campbell, 1995). Piping Plovers begin arriving along the Texas coast in mid-July and stay throughout the winter, returning to their breeding grounds around April (Campbell, 1995). This species could migrate through the project area; however, because preferred habitat for the species is not present, any use of the project area would be considered very unlikely.

The Sprague's Pipit (*Anthus spragueii*) is a candidate for listing as threatened or endangered; currently considered warranted but precluded (Federal Register 2012). This species is a wintering migrant known to occur on the coastal prairies in Texas. This species does not have extensive published locality information; however, it is not known from Smith County and in the U.S. is most frequently associated with mid and south coastal prairie sites such as Attwater's Prairie Chicken National Wildlife Refuge, Anahuac National Wildlife Refuge and Mid-coast National Wildlife Complex Important Bird Areas (WildEarth Guardians, 2008). Due to a lack of suitable habitat, this species would not be expected to occur in the project area.

The Louisiana black Bear (*Ursus americanus luteolus*) is federally listed as threatened. Due to field characteristics similar to the black bear, all east Texas black bears are treated as federally

and state-listed as threatened; however, only the Louisiana black bear subspecies is actually federally listed. Black bears have been sighted at 24 locations in 22 east Texas counties since 1977; these include: Anderson, Angelina, Bowie, Cass, Fannin, Franklin, Hardin, Harrison, Henderson, Hopkins, Jasper, Lamar, Marion, Morris, Nacogdoches, Newton, Panola, Polk, Red River, San Jacinto, Shelby, and Wood Counties (TPWD, 2005). Most of these sightings have been of individual bears, and it is thought that most are juveniles or sub-adult males that have entered the regions from the expanding populations in nearby Louisiana, Arkansas, and Oklahoma. In 2003 a black bear sighting was reported by a school bus driver in Wood County, just north of the project area (TPWD, 2005). Sightings such as this are rare, and no sightings of black bears have occurred in Smith County since before 1977 (TPWD, 2005). Although the project area does contain forested land, habitat fragmentation and nearby development preclude the establishment of a resident population of bears in the area. It is possible that a transient bear could pass through the area, utilizing larger forested tracts for stopover sites and forested riparian areas as travel corridors; however, such use of the project area would be considered unlikely, given the development around the city of Lindale to the east of the proposed project and the city of Hideaway to the west of the proposed project.

The red wolf (*Canis rufus*) is federally listed as endangered. The species is extirpated from the state of Texas; the last reported occurrences within the state were in the early 1960s (Davis and Schmidly, 1994). Formerly, the species were found throughout the eastern half of Texas, but land use changes, including lumbering and farming, as well as dilution of the gene pool as a result of interbreeding with coyotes (*Canis latrans*) led to their decline. Extinct from the wild in the United States by 1980, reintroduction programs utilizing captive breeding populations have been somewhat successful in North Carolina and Mississippi, but human population pressures makes reestablishment in Texas unlikely (Davis and Schmidly, 1994).

The Louisiana pine snake (*Pituophis ruthveni*) is a candidate for listing as threatened or endangered, but is not currently afforded any federal regulatory protection. It is listed as threatened by the state of Texas. This diurnal snake is buff or yellowish with dark brown markings. It closely resembles and is related to the bullsnake (USFWS, 2007). The average adult Louisiana pine snake is 48 to 60 inches in length and feeds primarily on small mammals. Baird's pocket gophers, with which they often share burrows, are a main food source (USFWS, 2007). This species is a capable burrower that is adapted to digging in sand and loose soil (Werler and Dixon, 2000). The preferred habitat of this species consists of open longleaf pine-oak sandhills interspersed with moist bottomlands. The main threat to the species is habitat loss due to intensive lumber harvest. Slash pine monocultures that are often used to replace native longleaf pine forests are unsuitable habitat for the Louisiana pine snake (Werler and Dixon, 2000). Originally known from nine parishes in Louisiana and 14 counties in Texas, they are now only found in four Louisiana parishes and five Texas counties (USFWS, 2007). Recent occurrences in Texas are restricted to Sabine, Newton, Angelina, Jasper, and Tyler Counties;

almost all of these snakes have been sighted in the Sabine and Angelina National Forests. The project area does not provide the preferred habitat for the Louisiana pine snake.

III.G.5.c. State-Listed and Rare Species

Seventeen state-listed species that are not federally listed or a federal candidate for listing could potentially occur in Smith County, including five mollusks, three fish, four reptiles, four birds and one mammal. State-listed species are protected from direct harm, but there is no current regulatory protection for their habitat.

Potential habitat for nine species that are state-listed as threatened exists within the project area. The Louisiana pigtoe (*Pleurobema riddellii*) and Texas heelsplitter (*Potamilus amphichaenus*) could occur in project area streams. The creek chubsucker (*Erimyzon oblongus*) and alligator snapping turtle (*Macrochelys temminckii*) could occupy project area waterways. The northern scarlet snake (*Cemophora coccinea copei*) could occur in areas with mixed hardwood scrub vegetation. The timber/canebrake rattlesnake (*Crotalus horridus*) could occur within project area floodplains, upland pine or deciduous forests, or riparian zones. The Texas horned lizard (*Phrynosoma cornutum*) could occur in areas of deep sands within the project area. Bachman's Sparrow (*Aimophila aestivalis*) could occur within project area open pine woods, brushy hillsides, or fields with brambles. The Wood Stork (*Mycteria americana*) could forage within project area wetlands, ponds, or ditches with shallow standing water. However, this species would not be anticipated to nest within the project area. Although habitat for these species occurs within the project area and individuals may be impacted by the proposed project, the proposed project is not likely to negatively impact these species. If impacts occurred, they would be very localized and have barely perceptible consequences to the species habitat. Sufficient habitat would remain functional to maintain viability of all species.

The state-listed endangered American Peregrine Falcon (*Falco peregrinus anatum*), and state-listed threatened Arctic Peregrine Falcon (*F. peregrinus tundrius*), and Bald Eagle (*Haliaeetus leucocephalus*) could migrate through the project area; however because the preferred habitat for these species is not present, any use of the project area would be considered unlikely.

No habitat for the state-listed threatened paddlefish (*Polyodon spathula*) or blackside darter (*Percina maculata*) occurs within the project area; thus, this species would not be anticipated to occur within the project area.

Potential habitat for 13 species considered rare by the State of Texas, but with no regulatory status, exists within the project area. The Carrizo leather flower (*Clematis carrizoensis*) could occur in areas of deep sands that are present in the project area. The Panicled indigobush (*Amorpha paniculata*) could potentially occur in wet floodplain forests and seasonal wetlands in

the project area. The Rough-stem aster (*Symphyotrichum puniceum var scabricaule*) could occur in the project area in open sites in saturated soils on Queen City, Carrizo, or Sparta sand formations. The Shinner's sunflower (*Helianthus occidentalis ssp plantagineus*) may occur on project area prairies. The Texas trillium (*Trillium texanum*) may occur near seeps within the project area. Two rare mussels, the little spectaclecase (*Villosa lienosa*), and Wabash pigtoe (*Fusconaia flava*), as well as two rare fishes, the ironcolor shiner (*Notropis chalybaeus*) and orangebelly darter (*Etheostoma radiosum*), might inhabit project area streams. The Sabine map turtle (*Graptemys ouachitensis*) could be found in project area ponds or reservoirs with abundant vegetation. The Henslow's Sparrow (*Ammodramus henslowii*) could occur in project area fields with blackberry or dewberry brambles as well as bare ground. The plains spotted skunk (*Spilogale putorius*) could inhabit project area fields, forest edges, or woodlands and the southeastern myotis bat (*Myotis austroriparius*) might inhabit man-made structures or tree cavities of bottomland hardwoods. Although habitat for these species occurs within the project area and individuals may be impacted by the proposed project, the project is not likely to negatively impact these species.

III.H. Cultural Resources

III.H.1. Regulatory Framework

NEPA requires agencies of the federal government to consider the effects of their actions on "the human environment," which includes both natural and cultural factors. Cultural resources are structures, buildings, archeological sites, districts (a collection of related structures, buildings, and/or archeological sites), cemeteries, and objects. Both federal and state laws require consideration of cultural resources during project planning. At the federal level, NEPA and the National Historic Preservation Act (NHPA) of 1966 (36 CFR 800), among others, apply to transportation projects such as this one. In addition, state laws such as the Antiquities Code of Texas (ACT; 13 TAC 26) apply to these projects. Compliance with these laws often requires consultation with the THC/Texas State Historic Preservation Officer (SHPO) and/or federally recognized tribes to determine the proposed project's effects on cultural resources. Review and coordination of this project followed approved procedures for compliance with federal and state laws.

Section 106 of the NHPA requires that federal agencies "take into account" potential impacts on significant cultural resources that could result from their actions (i.e. through federal funding, permitting, or actions on federally-owned land). The NHPA defines those significant cultural resources as properties listed on or eligible for listing on the National Register of Historic Places (NRHP – hereafter referred to as their regulatory-defined term of "historic properties"). In order to qualify for listing in the NRHP, a given cultural resource must meet one or more of the following federally defined criteria for eligibility as defined in 36 CFR 774:

- Criterion A: Have an association with events that have made a significant contribution to the broad patterns of our history, or
- Criterion B: Have an association with the lives of persons significant in our past, or
- Criterion C: Embody the distinctive characteristics of a type, period or method of construction, represent the work of a master, possess high aesthetic values, or represent a significant and distinguishable entity whose components may lack individual distinction, or
- Criterion D: Have yielded, or be likely to yield, information important in prehistory or history

In addition to meeting one or more of the criteria above, the resource must be 50 years or older (except in cases of exceptional importance), and the resource must retain integrity of location, design, setting, materials, workmanship, feeling, and association.

The SHPO (in Texas, this is the Director of the THC) reviews projects subject to Section 106 of the NHPA and determines if a resource meets the above-listed eligibility criteria and if it is eligible for listing as a Historic Property. The independent federal Advisory Council on Historic Preservation (ACHP) oversees the Section 106 process and is available to resolve disputes in the regulatory process.

Under the Technical Advisory 6640.8A of the FHWA, cultural resources determined eligible for listing in the NRHP by the SHPO which will be directly affected by an FHWA-funded project are subject to evaluation under Section 4(f) of the Department of Transportation (DOT) act of 1966 (23 CFR 774). Section 4(f) requires that the agency show that all planning to minimize harm to any NRHP property resulting from the proposed action was considered and that all feasible and prudent alternatives to avoid adverse effects to the NRHP property have been explored.

The proposed project also falls under the purview of the ACT because it may involve “lands owned or controlled by the State of Texas or any city, county, or local municipality thereof,” in this instance the rights-of-way purchased for the proposed roadway facility. The ACT requires state agencies and political subdivisions of the state, including cities, counties, river authorities, municipal utility districts and school districts, to notify the THC of any action on public land involving five or more acres of ground disturbance; 5,000 or more cubic yards of earth moving; or any project that has the potential to disturb recorded historic or archeological sites. Cultural resources that meet any of the following state-level significance criteria are eligible for listing as SALs:

- The site has the potential to contribute to a better understanding of the prehistory and/or history of Texas by the addition of new and important information;

- The site's archeological deposits and the artifacts within the site are preserved and intact, thereby supporting the research potential or preservation interests of the site;
- The site possesses unique or rare attributes concerning Texas prehistory and/or history;
- The study of the site offers the opportunity to test theories and methods of preservation, thereby contributing to new scientific knowledge;
- The high likelihood that vandalism and relic collecting has occurred or could occur, and official landmark designation is needed to ensure maximum legal protection, or alternatively, further investigations are needed to mitigate the effects of vandalism and relic collecting when the site cannot be protected.

The ACT also allows for NRHP-eligible properties to be considered as SALs. Under the ACT any impacts (or potential impacts) to SALs are only permitted under an Antiquities Code Permit.

All work for the proposed project was completed under the First Amended Programmatic Agreement for Transportation Undertakings (PA-TU) among the ACHP, FHWA, SHPO and the THC and the MOU between the THC and TxDOT. Section 106 and ACT coordination for this project was initiated in February of 2008. As of the date of this DEIS, these processes were still underway.

III.H.2. Archeology

III.H.2.a. Archival Data of Previously Recorded Archeological Sites and Surveys

Background research was conducted online at the Texas Archeological Sites Atlas to locate previous surveys and previously recorded archeological sites, NRHP-listed archeological properties and SALs. The search identifies one previously recorded archeological site within the Area of Potential Effects (APE) for the undertaking, near the southern project terminus, Site 41SM201. Under the PA-TU coordination for the proposed project, the APE for archeological resources is defined as the right-of-way limits. This site was recorded by Espey, Huston and Associates (EHA) in 1996 as part of an East Texas Electrical Cooperative survey for a transmission line. One well was encountered on the site along with glass, metal, and plastic debris and modern brick. One quartzite flake was also found, but considered an isolated find. The area had been bulldozed prior to site recording and no additional investigation was recommended. According to data available at the Texas Archeological Research Laboratory (TARL) and the THC, no additional previous surveys have been conducted that overlap or intersect with the current proposed projects proposed APE.

III.H.2.b. Archeological Survey of Alternatives D and G

In February and August of 2008, archeologists intensively surveyed all portions of the proposed Alternatives D and G for which right-of-entry had been granted. At the time of survey, right-of-entry had been granted to approximately 65 to 75 percent of Alternatives D and G. Conducting the survey under ACT Permit 4796, archeologists identified eight previously undocumented archeological sites (41SM388-41SM395) within the APE and revisited Site 41SM201 (Hicks & Company, 2009). These sites include prehistoric lithic scatters (41SM394-395), prehistoric lithic and ceramic scatters (41SM388 and 41SM393) and historic domestic sites and scatters (Sites 41SM201, 41SM389-392). Alternative D overlaps Sites 41SM201, 388-390, and 393-395. Alternative G shares the same APE of Alternative D through the southern half of the project area and also overlaps Sites 41SM201 and 41SM388-390. If a build alternative is chosen, all of these sites would be impacted by the proposed undertaking, regardless of which proposed alternative is chosen. Moving north, once Alternative G splits from Alternative D, it overlaps Sites 41SM391 and 41SM392. Archeological Sites 41SM201 and 41SM389-392 were recommended as ineligible for listing in the NRHP or as SALs. Archeological Sites 41SM388 and 41SM393-395 were recommended for NRHP/SAL-eligibility testing prior to construction to determine if any of the sites contain components that make them eligible for listing as historic properties and/or SALs (Hicks & Company, 2009). These investigations are discussed below. TxDOT and the THC reviewed the survey findings and concurred with the recommendations on February 25, 2010. ACT Permit 4796 was cleared on March 1, 2010. Section 106 consultation with federally recognized Native American tribes with a demonstrated historic interest in the area was initiated on March 4, 2008, and again following review of the final archeological survey report. No response was received during the comment period.

Further investigations to determine the eligibility status of Sites 41SM388 and 41SM393 and a potential platform mound were conducted in Summer 2011. Project archeologists submitted the results of these investigations to TxDOT and the THC in October 2012; as of the date of this DEIS, a response is pending. If TxDOT and the THC agree with the recommendations that these sites are not eligible for listing in the NRHP or as SALs, coordination will be complete for these sites. Sites 41SM394 and 41SM395 were not investigated to determine NRHP/SAL eligibility due to denial of right-of-entry. These sites cannot be investigated unless TxDOT receives right-of-entry or acquires this portion of the right-of-way.

Evaluation of potential project effects on archeological resources (direct impacts) could not be completed because right-of-entry was denied to some properties, preventing archeologists from conducting the necessary field work to determine the NRHP/SAL eligibility status of Sites 41SM394 and 41SM395. If access to the areas requiring field investigations is obtained, TxDOT would complete all required investigations and consultation. In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area would

cease, and TxDOT archeological staff would be contacted to initiate post-review discovery procedures.

III.H.3. Historic Structures

A review of the NRHP, the list of SALs, and the list of Recorded Texas Historic Landmarks (RTHLs) indicated that no historically significant resources have been previously documented within the APE. It has been determined through consultation with the SHPO that the historic resources APE for the proposed project, is 300 feet from the proposed right-of-way. A reconnaissance survey of both alternatives undertaken in 2008 identified 30 historic-age resources (built prior to 1970) within the APE. There are no Official Texas Historical Markers (OTHMs) in the project APE. None of the resources were determined eligible for listing in the NRHP.

Pursuant to Stipulation VI "Undertakings with Potential to Cause Effects" of the PA-TU between the FHWA, the SHPO, the ACHP, and TxDOT and the MOU, TxDOT Historians determined that there are no historic properties within the project APE.

III.I. Hazardous Materials

A hazardous materials assessment was conducted for the Lindale Reliever Route project area in December 2007 and updated in December 2010 and April 2013. The assessments included reviews of published records for state and federal agency records of hazardous material, hazardous waste, landfill locations, and areas of environmental concern within the project area. The searches included the following records: National Priority List (NPL), Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), Resource Conservation and Recovery Information System (RCRIS), Resource Conservation and Recovery Act (RCRA) Administrative Action Tracking System (RAATS), Emergency Response Notification System (ERNS), PCB Activity Database System (PADS), Toxic Chemical Release Inventory (TRI), State Registered Underground Storage Tanks (USTs) and Leaking Underground Storage Tanks (LUSTs) and Hazardous Sites. The database searches were conducted in a manner that complies with the American Society for Testing and Materials (ASTM) Standard E1527-05 and the EPA's All Appropriate Inquiries Standard; however, these actions are not considered to be a full Phase I Environmental Site Assessment. The database reports from December 2010 and April 2013 are included in **Appendix D**.

The database reports indicated that no regulated sites are located within the proposed footprints of Alternative D and G. Mea Nursery, located near the northern boundary of the proposed alignments, is listed in the Texas Underground Storage Tank database in the report from December 2010. The tanks at this site are listed as "Removed." However, the Mea Nursery site

was not reported during the April 2013 search. Also, Hawley Sanitation is listed as a RCRA Generator (RCRA-G) and as a TCEQ Solid Waste Facility (specifically, an active resource recovery and recycling facility). This site is located approximately 0.14 miles from the project area. Neither of these sites would be anticipated to adversely impact the proposed project.

The hazardous materials surveys performed in December of 2007 and December of 2010 identified and confirmed two additional sites with the potential for hazardous materials concerns. These sites include: The Lindale Fertilizer facility located on US 69 approximately 1,000 feet north of the US 69 and CR 117 intersection and the "junkyard" property located south of and adjacent to the fertilizer facility (see **Table 29** and **Potential Environmental Constraints Plate 1** in **Appendix A**). Several large buildings and an Aboveground Storage Tank (AST) were observed on the Lindale Fertilizer property. The "junkyard" property adjacent to the south includes several dilapidated buildings and large quantities of unknown solid waste and debris. The dilapidated buildings appear to be the abandoned remains of a roadside produce/vendor operation with crates, containers, and miscellaneous equipment stored under the cover of or in the vicinity of the buildings.

Each of the latter two sites has been evaluated for the apparent level of effect that each site may have on the project area, and the risk for encountering hazardous waste concerns was assessed. Risk is evaluated as high, medium, or low concern to the proposed roadway. A "low" potential for concern is assigned to properties that would have limited involvement with the proposed project. A "medium" potential for concern means that involvement with hazardous materials is possible during construction, and a "high" potential for concern means that field review and records indicate the existence of hazardous materials within the project boundaries.

The Lindale Fertilizer site has a medium level of hazardous material risk due to the current presence and use of aboveground diesel tanks and the likelihood of encountering contaminated soils in the fueling area during construction. The "junkyard" has a low hazardous material risk based on the presence of common household type refuse. Disposal of all solid waste encountered during construction would need to be performed in accordance with applicable federal, state and local regulations.

Table 29 Hazardous Materials Sites

	Location	Facility of Owner Name	Database Listing/Visual Survey	Risk	Roadway Alternative
1	19265 US 69 North	Lindale Fertilizer	AST	Medium	D
2	Highway 69	Abandoned Building/Junkyard	Unknown solid waste	Low	D

Source: Field Observations and TelAll HICY6675 Report. Conducted 12/14/10 and located in Appendix D.

was not reported during the April 2013 search. Also, Hawley Sanitation is listed as a RCRA Generator (RCRA-G) and as a TCEQ Solid Waste Facility (specifically, an active resource recovery and recycling facility). This site is located approximately 0.14 miles from the project area. Neither of these sites would be anticipated to adversely impact the proposed project.

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IV. Environmental Consequences

All projects of this magnitude have direct, indirect, and cumulative impacts on the human and natural environment. This section describes the potential direct impacts of the proposed project on the human and environmental resources of the project area. These potential impacts, as well as mitigation measures, are discussed with regard to specific resource categories. These resource categories include land use and agricultural resources, social/community effects, relocation effects, public safety, economic effects, geological resources, air quality, noise, hydrologic elements, biological resources, wetlands, threatened/endangered species, floodplains, cultural resources, hazardous materials, and visual resources. Indirect and cumulative impacts are addressed in later sections of the document.

The constraints associated with each resource category are discussed for both reasonable alternatives identified in **Chapter II** as well as the No Build Alternative. Comparisons between the alternatives with regard to specific resource categories were utilized in the identification of a Technically Preferred Alternative, also summarized in **Chapter II**.

This section discusses both short-term impacts, defined as construction-phase impacts, and long-term impacts, defined as impacts associated with the presence and operation of the proposed improvements. This section also addresses the environmental consequences and associated mitigation measures of the various reasonable road alignment alternatives within each resource category, as well as summarizes the environmental consequences and mitigation measures related to the construction phase of the proposed project.

IV.A. Land Use Impacts

IV.A.1. Impacts to Existing Land Uses, Public Facilities and Services

IV.A.1.a. No Build Alternative

The No Build Alternative would not result in any direct impacts to land use. However, as Lindale grows, increasing numbers of people would live and work in new and different locations, and the location of social and economic activities would shift. This shift would require a corresponding change in the city's transportation network. With growth in Lindale shifting away from the central city to outlying areas, new or improved travel ways would be needed to satisfy the increased demands on the transportation network. If the Lindale Reliever Route is not constructed, modifications would need to be made to US 69 and other north-south thoroughfares to alleviate traffic congestion. Modification to already developed roadways could result in impacts to adjacent homes and businesses. The No Build Alternative would also preclude the utilization of the reliever route as a bypass route for through traffic.

IV.A.1.b. Build Alternatives

The majority of the land that would be directly impacted by the proposed project is undeveloped. Other impacted land uses include residential, commercial, and community facilities. **Table 30** summarizes land use impacts for the build alternatives for the proposed project. Land use categories within and adjacent to the Build Alternative corridors are mapped on **Potential Environmental Constraints Plates 1–7** in **Appendix A**. Undeveloped land uses are summarized by vegetation type in **Table 44** in **Section IV.G.1.b**. In addition, both build alternatives cross similar utility lines and pipelines which would require adjustments. Impacts to these utilities would be mitigated during the design of the highway and would be comparable for both of the proposed build alternatives.

Table 30 Land Use Impacts

Land Use Impacted	Alternative D (acres)	Alternative G (acres)
Residential	20.27	10.82
Commercial	25.97	21.42
Oil and Gas	0	0
Public Facility	0	0
Community Facility	19.23	18.11
Undeveloped	357.68	377.15

Alternative D

Alternative D would impact approximately 20.27 acres of land in residential use. Much of the residential land impacted is concentrated near US 69 in an older, un-named neighborhood and another area of concentration is found just south of FM 16 West in another un-named neighborhood. A few scattered rural residences are impacted as well. No public facilities would be impacted.

Approximately 25.97 acres of impacted land is in commercial use, and the affected businesses and the nature of the impacts to them is described below. Impacted commercial businesses include Trees USA, one quarry/sand pit property, Arabella Garden Retreat Bed and Breakfast, Renfro World Class Fireworks, Lindale Fertilizer, Lindale Veterinary Clinic, Hide It Away Storage, Holey Plumbing Company, and Foshee Septic Service. Trees USA would remain operational; however, planting beds (and surrounding pathways) and irrigation networks at Trees USA would need to be removed and/or reconfigured. The quarry/sand pit operation is located immediately north of FM 16. Due to the disruption both routes would cause (the property would be bisected by both Alternatives D and G), the property would be acquired by TxDOT if the proposed project is built. Arabella Garden Retreat Bed and Breakfast is just south of FM 16 and is impacted by both Alternatives D and G. This parcel would lose a small amount of land to right-of-way use and would also be affected by traffic and additional noise in what is currently a

quiet rural site. Lindale Veterinary Clinic, located on FM 16 West, would have some impacts related to drive access due to widening FM 16 along their frontage, regardless of alternative, but remain operational. Renfro World Class Fireworks, Lindale Fertilizer and Hide It Away Storage would be completely displaced by Alternative D, whereas Holey Plumbing Company and Foshee Septic Service would remain operational but would have some impacts related to access and/or facility changes (e.g., parking lot impacts).

Approximately 19.23 acres of community facilities would be impacted, including Timberline Baptist Camp, Calvary Commission, and VFW Post 9828. Community facilities include those that are privately owned but may serve several members of the community, such as a church or golf course. The VFW building would not have to be relocated but would experience parking lot impacts. Both Timberline Baptist Camp and the Calvary Commission would have about 18.11 acres along the western edge of the property acquired for the proposed project, with no structures impacted. Activities at these locations could continue.

Alternative G

Alternative G would impact approximately 10.82 acres of land in residential use. Much of the residential land impacted is concentrated just south of FM 16 West; other residential impacts consist of scattered rural residences.

Approximately 21.42 acres of land impacted is in commercial use. Impacted businesses include Trees USA, a quarry/sand pit operation, Lindale Veterinary Clinic, and Arabella Garden Retreat Bed and Breakfast. Impacts to Trees USA, the quarry pit, Lindale Veterinary Clinic, and Arabella Garden Retreat Bed and Breakfast by Alternative G would be the same as those discussed in the previous section for Alternative D. Alternative G would not impact Lindale Fertilizer, Hide It Away Storage, Holey Plumbing Company, Foshee Septic Service or the VFW Post 9828.

Approximately 18.11 acres of the Timberline Baptist Camp and Calvary Commission would be impacted, with identical impacts caused by Alternative G as discussed above for Alternative D.

All of the impacted businesses and community facilities along both build alternatives have been contacted and visited by the TxDOT Mineola Assistant Area Engineer and TxDOT consultants.

IV.A.2 Relocations and Displacements

IV.A.2.a No Build alternative

There would be no relocations or displacements as a result of the No Build Alternative.

IV.A.2.b Build Alternatives

Residential and commercial displacements required by Alternatives D and G are shown on **Potential Environmental Constraints Plates 1–7** in **Appendix A**.

Alternative D

Table 31 lists relocations and displacements that would result from construction of Alternative D. All other businesses and community facilities discussed under Alternative D in **Section IV.A.1.b**. but not included in **Table 31** would have property impacts but would not be displaced. Some property would be acquired from these facilities, but existing structures would not be impacted. **Table 32** provides Smith County Appraisal District (SCAD) information from April 10, 2013, for properties displaced by Alternative D.

Table 31 Relocations and Displacements – Alternative D

	Number	Details
Residential Relocation	18	10 single-family homes and 8 mobile homes
Commercial Displacement	6	Renfro World Class Fireworks; Hide It Away Storage; Lindale Fertilizer; a warehouse; a small commercial structure of unknown use; and a quarry/sand pit operation.

Table 32 Alternative D Residential Relocations –SCAD Data

ALTERNATIVE D

SCAD Account	Address	Home Type	Home Size (sq ft)	SCAD Value
100000040900002010	0 HWY 69 N	Single Family	912	$86,650
100000040900002001	19550 US HIGHWAY 69 N	Single Family	1,624	$109,945
100000093000001010	19470 US HIGHWAY 69 N	Single Family	600	$135,618
100000093000001110	19264 US HIGHWAY 69 N	Single Family	1,352	$54,938
100000093000015001	19228 US HIGHWAY 69 N	Single Family	512	$86,674
100000093000009000*	19208 COUNTY ROAD 4116	1 Single Family; 1 Mobile Home	979	$40,851
100000093000008010	19120 COUNTY ROAD 4116	Single Family	728	$36,667
100000103500020041	19121 COUNTY ROAD 4116	Single Family	1,124	$40,964
100000103500020060	19051 COUNTY ROAD 4116	Single Family	1,200	$20,209
100000103500028000*	18977 COUNTY ROAD 4116	1 Single Family; 1 Mobile Home	952	$40,000
100000103500036000	18928 COUNTY ROAD 4118	Single Family	720	$16,500
100000103500020030	18720 COUNTY ROAD 4118	Mobile Home	1,216	$15,435
100000085900022010	PO BOX 247	Mobile Home	NA	$52,810
100000085900019030*	16457 F M 16 W	1 Single Family; 1 Mobile Home	1,388	$95,031
100000096100002000	15191 FM 849	Single Family	1,356	$190,162

* SCAD account provided only one size and value, though there is more than one structure on the parcel.
Note: data presented exactly as found at www.smithcad.org.

Residential relocations may be more difficult to accomplish and take more time for Alternative D than Alternative G, as lower cost homes are less available on the market. If Alternative D were selected and no replacement housing is available within the financial means of the displacees, last resort housing provisions may be used to ensure all displacees are relocated to decent, safe and sanitary housing.

Similarly, business relocations may be more challenging for Alternative D than G, given the number affected and fairly specialized nature of their products and services. Businesses such as fireworks retailers and quarry/sand pits require specialized locations and settings which are inherently more challenging to relocate than a typical retailer. Business relocations may be facilitated by the recent development of a small (15-20 acres) industrial/commercial park along US 69 near the northern terminus of the reliever route alternatives (Clary, personal communication, April 2013).

Alternative G

Table 33 lists relocations and displacements which would result from construction of Alternative G; there are no businesses or community facilities that would only have property impacts. **Table 34** provides SCAD information from April 10, 2013, for properties displaced by Alternative G.

Table 33 Relocations and Displacements – Alternative G

	Number	Details
Residential Relocation	10	7 single-family homes and 3 mobile homes
Commercial Displacement	1	A quarry/sand pit operation

Table 34 Alternative G Residential Relocations –SCAD Data

ALTERNATIVE D				
SCAD Account	Address	Home Type	Home Size (sq ft)	SCAD Value
100000046700005050	19985 HWY 69 N	Single Family	960	$46,488
100000040900002020	19591 N HWY 69	Single Family	2,031	$157,184
147510000000001000	19551 HWY 69 N	Mobile Home	1,848	$12,104
100000040900002002*	19577 HWY 69 N	Single Family (2)	1,960	$152,320
100000085900022010	PO BOX 247	Mobile Home	NA	$52,810
100000085900019030*	16457 F M 16 W	1 Single Family; 1 Mobile Home	1,388	$95,031
100000096100002000	15191 FM 849	Single Family	1,356	$190,162
100000085900032000	16539 F M 16 W	Single Family	2,448	$154,233

* SCAD account provided only one size and value, though there is more than one structure on the parcel.
Note: data presented exactly as found at www.smithcad.org.

Generally, given the lower number and diversity of residential and business relocations caused by Alternative G, it is likely that displacees could more quickly recover than those of Alternative D.

To ensure that decent, safe, and sanitary dwellings would be available to all affected residents, the State's Relocation Assistance Program (RAP) would be available to all individuals and families displaced as a result of construction of the proposed project. The acquisition and relocation program would be conducted in accordance with the federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (P.L. 91-646). Relocation resources would be made available to all residential relocations and business displacements without discrimination, consistent with the requirements of the Civil Rights Act of 1964 and the Housing and Urban Development Act of 1974.

According to the 2011 ACS, median home values in block groups where relocations would occur ranged from $106,900 in BG 2 of CT 14.04 to $175,000 in BG 4 of CT 14.01. The 2011 median mobile home value in the block groups where displacements would occur ranged from $30,700 to $59,000. Based on data from SCAD, there is a wide range of home size and corresponding values for properties which would be displaced by either of the alternatives. Home size, including mobile homes, varies from 512 to 2,448 square feet, and SCAD assessed values range from $12,104 to $190,162.

A property database search was conducted on April 10, 2013, for comparable residential properties in ZIP Code 75771, which includes Lindale and Hideaway. **Table 35** summarizes the residential properties listed for sale as well as the number of homes potentially displaced by both alternatives in each price range. While it appears that there may not be adequate replacement housing in the lower value ranges, it should be noted that assessed values do not always correspond with market values. If comparable housing is not available at the time of right-of-way acquisition, TxDOT would, if necessary, provide housing supplement payments in excess of the standard payment limits to ensure that decent, safe, and sanitary dwellings are made available to all eligible displacees.

Table 35 Residential Properties for Sale in ZIP Code 75771

Price Range	Single-Family Home	Mobile/Mfctd. Home	Number of Displaced Homes in Range
Under $25,000	1	0	4
$25,000 - $50,000	2	0	5
$50,001 - $75,000	5	2	3
$75,001 - $100,000	14	3	4
$100,001 - $125,000	21	0	1
$125,001 - $150,000	35	1	1
$150,001 - $175,000	14	0	3
$175,001 - $200,000	16	0	2
$200,001 - $225,000	8	0	0
$225,001 - $250,000	9	0	0
$250,001 - $275,000	3	0	0
$275,001 - $300,000	14	0	0
$300,001 - $325,000	5	0	0
$325,001 - $350,000	8	0	0
over $350,000	17	0	0

Source: www.realtor.com, accessed April 10, 2013.

A database search at www.loopnet.com was conducted for commercial properties for sale and lease in Zip Code 75771 on April 10, 2013. There were 14 (six buildings and eight real estate sites) commercial/retail properties for sale, mostly along IH 20 or US 69 in Lindale. It appears that there would be adequate opportunities for the displaced businesses to relocate nearby.

The proposed project would require displacement of structures which may include asbestos-containing materials. Asbestos inspections, notifications, abatement, and related requirements, as applicable, would be addressed prior to project construction.

IV.A.3. Public Parks, Wildlife Refuges, Historic Sites (Section 4[f] Resources; Section 6[f] Resources)

Section 4(f) of the DOT Act of 1966 (49 U.S.C. 303, as amended), provides for the protection of certain lands affected by transportation projects. Section 4(f) provides that the Secretary of Transportation may not approve any program or project which requires the use of land from a publicly owned park, recreational area, or wildlife and waterfowl refuge of national, state, or local significance as determined by the official having jurisdiction thereof, or any significant historic site, unless a determination is made that there is no feasible and prudent alternative to the use of such land and the proposed action includes all possible planning to minimize harm.

No public parkland, wildlife or waterfowl refuges, or NRHP-eligible historic properties would be impacted by the proposed improvements. Therefore, the proposed project would not require the use of Section 4(f) properties and no further analysis is required.

There are no public lands in the project area subject to the protection of Section 6(f) of the Land and Water Conservation Fund Act (16 U.S.C. 4601-4).

IV.A.3.a No Build Alternative

The No Build Alternative would not require the use of any Section 4(f) resources.

IV.A.3.b Build Alternatives

No public parks, recreation areas, wildlife or waterfowl refuges, or significant historic properties would be impacted by either of the proposed build alternatives.

IV.A.4. Agricultural Effects

IV.A.4.a. No Build Alternative

The No Build Alternative would not result in any impacts to farming or ranching operations or to prime farmland soils.

IV.A.4.b. Build Alternatives

Both of the proposed build alternatives would impact land utilized for cattle grazing. No cropland (other than hay providing pastures) or orchards would be impacted by the build alternatives. Trees USA, a nursery, would be impacted by both of the Build Alternatives but would remain operational. Alternative D impacts 373.17 acres of land potentially used for agricultural purposes. Alternative G impacts 394.55 acres of land potentially used for agricultural purposes. The majority of impacts to farms and ranches affect boundaries and did not leave remainders without access; segmentation by the alternative highway alignments, however, may constrain access by farm equipment and livestock in some instances. One undeveloped tract with native timber resources adjacent to Fox Run Estates would be impacted by both alternatives and would need specific real estate transactions to restore access. TxDOT would need to purchase adjacent property that has public access to a public street or road or require an easement across adjacent property to assure access to a landlocked portion of the affected property. Another nearby tract utilized for hay and nursery production with multiple access points would be severed and would be inconvenienced by internal traffic circulation changes but not completely rendered useless (see **Potential Environmental Constraints Plates 6–7**).

IV.B. Socioeconomic and Community Impacts

IV.B.1 Economic Impacts

IV.B.1.a. No Build Alternative

Under the No Build Alternative, there would be no governmental expenditures on acquisition or construction. Conversely, no positive economic effects would be realized by the community from the construction expenditures associated with the proposed project.

IV.B.1.b. Build Alternatives

The proposed project may have a temporary positive impact on the local construction sector, and may have a temporary negative impact while displaced businesses are relocating during the

right-of-way acquisition phase. In the long term, the increased mobility may encourage businesses to move to the area. It is possible that the proposed project would alter the visibility of traffic-based businesses along US 69 by removing some of the traffic from the existing route; however, it has been the opinion of local leaders that the proposed reliever route would further positive development in downtown Lindale. Lindale Area Chamber of Commerce (LACC) Executive Director Shelbie Glover, provided the following quote:

> We estimate that over 75 percent of the businesses in Lindale are members of the LACC. We have over 450 members currently in the Lindale Chamber. The LACC is in favor of the proposed Loop 49 project for several reasons:
>
> - This will help with traffic flow and management in the city of Lindale. Each day thousands of cars and 18 wheelers travel through Lindale on Hwy 69. Loop 49 will enable them to bypass town.
> - This will also allow for Hwy 69 to be safer for both pedestrian traffic and local traffic. It is very difficult to cross Hwy 69 with the amount of traffic we currently have.
> - Another issue with the 18-wheelers is safety; not only is it harder to stop the rig, they are also potentially carrying hazardous materials.
> - By diverting the truck traffic to Loop 49 it will make Lindale an attractive place to shop and increase business development. In summary, the LACC has supported this project for years. We are looking forward to the I-20 to 69 connection to begin. We feel that Lindale will continue to grow in the next ten years and that this reliever route will curtail the through traffic in Lindale. We have no fear of loss of business because of the Loop and look forward to the expansion (Glover personal communication via email, June 18, 2009).

As Ms. Glover mentioned, there are over 450 business members in the LACC, and a full listing of those businesses is attached in **Appendix G**. Of these, approximately 80-100 could be characterized as traffic dependent businesses (automobile sales/services, gas stations, hotels/motels, restaurants, retail, etc).

Studies have found mixed results regarding the impact of highway construction on property values. Highway construction may have an adverse impact on some properties, but in the aggregate, property values tend to increase with highway development. Also, highways do not affect all properties' values in the same way. Proximity to the highway was observed to have a negative effect on the value of detached single-family homes in one case study in Arizona (Carey and Semmens, 2001). Generally speaking, where roadway improvements occur, the value of commercial property can be enhanced (Siethoff and Kockelman, 2002). Impacts to the area's tax base are anticipated to be minimal, as it is anticipated that most of the displaced residents and businesses would be able to relocate within the same jurisdiction or nearby.

On a local level, some concerns were raised regarding economic impact, particularly in the early phases of the corridor analysis. Former Mayor Bill Kashouty of Hideaway felt that the proposed project would likely have adverse effects on property values in his city because of an increase in noise and air pollution. While Hideaway residents would be able to access the reliever route from the north gate via FM 16, they already have a fast and convenient way of accessing Tyler via IH 20 from the south gate – residents would simply get on IH 20 east and for now, drive to US 69 and head south to Tyler (Kashouty, 2008). In the future, assuming Loop 49 is completed up to IH 20, they would be able to drive a short distance to the east from their south gate on IH 20 to Loop 49 West and go to Tyler. Mayor Kashouty felt, therefore, that the proposed project would not greatly increase access for Hideaway residents. Mayor Kashouty and the Hideaway residents were much more concerned when an alternative corridor further west (closer to their community) was being considered; their comments were not only considered, but acted upon. The final set of reasonable alternatives considered in the DEIS does not include the previously considered westernmost alternative corridor and only evaluates proposed build alternative alignments to the east. The current alternatives pose much reduced potential for noise and air pollution impacts to their community.

Economic impacts for the proposed build alternatives are provided below. The proposed project would indirectly affect the local economy due to employment, both construction-related and long-term, and income benefits locally and regionally. Generalizations about the proposed project's economic effects can be made using the U.S. Department of Commerce Bureau of Economic Analysis RIMS II Multipliers. Industry-specific final-demand multipliers (in this case, Construction) are provided in order to estimate the total change in output (sales), household earnings, and employment per dollar of final-demand change (cost of the project). When applied to the proposed project's estimated construction cost of $63 million (derived from the 2013-2016 STIP, which does not differentiate the costs of the build alternatives), the RIMS II multipliers produce an estimated total output effect of $112.7 million, an earnings effect of $33.2 million, and 742 new jobs. **Table 36** provides a full breakdown of the direct, indirect, and induced effects on output, earnings, and employment resulting from this expenditure.

Table 36 Estimated Economic Impacts of Proposed Build Alternatives

Category	Total	Direct	Indirect	Induced
Output ($)	112,738,252	62,954,128	25,238,310	24,545,815
Earnings ($)	33,157,939	20,521,118	6,416,954	6,219,868
Employment (jobs)	742	424	133	185

Source: U.S. Bureau of Economic Analysis, RIMS II Multiplier System, Table 2.5, 2010 Total Multipliers for Output, Earnings, and Employment, by Industry Aggregation for Smith County, Texas (Types I and II).

IV.B.2 Community Impacts

Many of the impacts discussed in other sections of this document can be considered community impacts, such as noise and air quality, relocations, and changes in accessibility. Per FHWA's guidance on Community Impact Assessment (FHWA, 1996), impacts should be discussed in the following categories: social and psychological; physical; visual; land use; economic; mobility and access; provision of public services; safety; and displacements. These categories will be addressed in this section, with the exception of land use and economic categories, which are covered in **Sections IV.A** and **IV.B.1**, respectively.

Although public involvement conducted for the proposed project indicates broad general support, negative comments received during three public meetings indentified some concerns over increased noise, air pollution, and diminished quality of life. Many people signed petitions opposing impacts of previously considered alternative corridors to the Timberline Baptist Camp, and/or Hideaway. Public comments in the latter two public meetings show greater public support for Alternative G (the Technically Preferred Alternative) than Alternative D.

IV.B.2.a No Build Alternative

The No Build Alternative would not require any acquisition of property or cause any land use changes. Aside from those associated with increased traffic congestion on US 69 in Lindale, there should be no physical or noise impacts in Lindale or Hideaway.

The positive impacts of improved mobility and safety through Lindale would not be realized under the No Build Alternative, which would leave the existing roadway network intact. The benefits of traffic congestion management and the safety improvements that would result from the construction of the proposed relief route would not occur under the No Build Alternative. The existing roadway system would be increasingly burdened by excess traffic and unacceptable levels of service, especially US 69 in Lindale. As traffic conditions deteriorate, the No Build Alternative would eventually require improvements to US 69 which would be both costly and disruptive to existing businesses and travelers.

IV.B.2.b Build Alternatives

Social and Psychological Impacts

The primary sources for evaluation of social and psychological community impacts consist of the results of the public involvement process and public sentiment as expressed in recorded comments, both verbal and written. The vast majority of comments received during the early public meetings (once preliminary corridors were defined) focused upon concerns over

displacements, increased noise, and impacts to the city of Hideaway and the Timberline Baptist Camp. As project planning moved forward, the corridors closest to Hideaway and Lindale were eliminated in favor of the potential Build Alternatives D and G. In addition, the alignments for Alternatives D and G were altered so that impacts to the Timberline Baptist Camp would be minimized. The reasonable alternatives that were chosen avoid the city of Hideaway, have the least number of displacements and noise impacts, and have fewer impacts to the Timberline Baptist Camp. A summary of public comments from meetings held after preliminary and potential build alternatives were defined is shown in **Table 37**.

Table 37 Summary of Public Comments

Topic	Number of Persons
September 25, 2006, Public Scoping Meeting for US 69 Lindale Reliever Route EIS	
Wants Reliever Route far away from Hideaway	5
Project not needed	2
Does not want route E (noise, pollution)	5
Make decision soon	1
Use straight north route	1
No build or Option D, with maintained access to Staples property via CR 473	1
People directly within the project area should have more of a say than those in Hideaway.	1
Hideaway residents signing petition expressing opposition to Option E	266
Total	282
May 22, 2007, Second Public Scoping Meeting for US 69 Lindale Reliever Route EIS	
For Option A	4
For Option B	6
For Option C	3
For Option D	8
For Option E	4
For Option F	0
Against Option D	7
Against Option E	13
Against Option F	10
Against Option G	2
Not in my backyard	38
Avoid taking property from Timberline Baptist Camp	213
Signed petition expressing concern for Timberline Baptist Camp	605
Total	913
November 27, 2007, Public Meeting for US 69 Lindale Reliever Route EIS	
Support Alternative D	3
Support Alternative G	10
Do not support Alternative D	2
Does not want traffic lights on project	1
Wants project website updated	1
Does not support the project	1
Would prefer a four-lane roadway	1
Total	19
June 10, 2008, Public Meeting – Summary of Comments	
Supports project/preferred alternative	6
Concerned about access to property	1
Suggests light rail be considered	1
Feels that project is unnecessary	1
Would like to know when new ROW would be acquired	1
Would like to know if tolling will speed construction of the new road	1

Table 37 Summary of Public Comments (continued)	
Topic	**Number of Persons**
Would like to know what plans are in place to deal with traffic in the event that the no build alternative is enacted	1
Concerned that toll road will not be used if gas prices continue to rise	1
Would like to know objective of project	1
Would like to know how many people have attended all of past public involvement opportunities for this project	1
Total	**15**

Because the proposed project consists of a limited access, tolled reliever route with minimal direct relocations, it is not anticipated to cause the redistribution or influx/loss of population in Lindale. In other words, only a specific sector of the driving public seeking to avoid downtown Lindale is anticipated to use it since they would be charged a fee (see **Section IV.B.3.e** for a description of toll costs). It can be assumed that motorists using the reliever route would not be expected to provide much economic impact to the community itself since they are just passing through. Therefore, the loss of that traffic is not expected to result in an economic impact of the sort which could cost jobs in the community. Similarly, the proposed project is not anticipated to impact community cohesion through changes to social relationships or residential patterns or to separate people, because the majority of properties impacted are in low density rural settings (the bulk of the population is to the east of the proposed project), and access to almost all impacted properties would be maintained. The proposed project is not anticipated to cause a change in social values as it is simply a transportation facility designed to make through travel more efficient for those seeking to avoid congestion in the Lindale area.

Planning documents provide another indication of a community's priorities regarding quality of life. According to the 2004 Lindale Second Century Comprehensive Plan (City of Lindale, 2004), the City's goals with respect to planning and community design include:

- Preserve historic integrity of the community while accommodating new, high quality growth; and,
- Enhance downtown's role as the heart of the community and a crossroads activity center.

Given these goals, quality of life may be perceived as improving as a result of the reliever route project because of the increased mobility and safety, as well as reduction in projected future traffic through downtown.

Physical Impacts

The project area, which consists of mostly undeveloped land between Lindale and Hideaway, would be converted to transportation use. The proposed project would create a new physical barrier between the two communities of Lindale and Hideaway.

Traffic noise impacts are addressed in more detail in **Section IV.C**. It appears noise would only impact two residences along Alternative D and would not impact any residences along Alternative G. Cut/fill decisions for the Lindale Reliever Route were used to help minimize noise impacts from the proposed project, as shown on **Potential Environmental Constraints Plates 1-7** in **Appendix A** and listed below:

- a cut section just north of IH 20 would reduce impacts at the Lockhart and Trees USA properties;
- cutting under the existing roadway at FM 849 would lower impacts at that interchange;
- depressing the Lindale Reliever Route facility adjacent to the Westwood Subdivision north of FM 16 would minimize impacts to the subdivision; and
- for Alternative G, depression of the facility under the CR 4118 roadway lessened impacts as the facility approaches US 69 north of Lindale.

Visual Impacts

Because the proposed project consists of a new location roadway, changes to the aesthetic character of the area between Lindale and Hideaway are anticipated (see **Section IV.J** for more detailed discussion of aesthetic/visual impacts).

Subdivisions located alongside the proposed project include Fox Run Estates, Westwood, Stevenson Creek Estates, and Meadow Crest. In order to minimize visual impacts, efforts were made to lower the proposed project's vertical alignment in the vicinity of adjoining subdivisions.

Visual impacts would be mitigated, in part, by cut/fill decisions for the proposed project. This involves considering ways to minimize visual impacts to adjacent residents, property owners or the traveling public, wherever excavated or filled areas occur along the project alignment. In some cases, the need to excavate or fill can be used as a way to create a better visual result. Examples of such decisions and their mitigating effects follow. A cut section just north of IH 20 would reduce visual impacts for the Lockhart and Trees USA properties because the roadway would be below grade and less visible. Cutting under FM 849 lowered the visual impacts in the area around the proposed interchange for the same reason. At FM 16, earthwork economics necessitated that the proposed facility, extend over the existing FM 16 roadway, so in this case, an overpass would be visible. Depressing the facility adjacent to the Westwood Subdivision north of FM 16 lowered the visual impacts to that subdivision by making the roadway less obvious. For Alternative G, the roadway was depressed under CR 4118 to lessen the visual impacts as the facility approaches US 69 north of Lindale.

Impacts associated with light pollution would not be anticipated since the proposed project would not add substantial amounts of illumination to areas that do not currently possess lighted highways. The existing segments of Loop 49 are lighted, as well as IH 20. Lighting along either

of the build alternatives would be installed in a manner that would minimize potential light pollution for neighboring areas.

Mobility and Access Impacts

Most of the major employers in the region are located along IH 20 or south in Tyler; therefore, commuters who live north of Lindale are most likely to benefit from a shorter commuting time. To estimate potential travel time savings, TxDOT Tyler District staff performed field time trials to determine existing times among existing US 69. District Staff drove US 69 between FM 16 in Lindale (commute origin) to US 69 in south Tyler (commute destination) to determine actual commute travel times for both the peak and off peak time period. These travel times reflect travel through three school speed zones and 35 traffic signals. A simple calculation of nonstop travel on existing US 69 at posted speeds from north of Lindale to south of Tyler is estimated to take 27.9 minutes. Actual travel time measured in the field trails was 52.9 minutes, which included 17 minutes of delay at 35 signalized intersections and two minutes of delay at four school zones, yields 46.3 minutes and another 6.6 minutes of other delay during peak traffic periods (e.g., waiting through two signal cycles at IH 20). Comparing actual travel time on existing roadways with estimated travel time on the proposed reliever route shows a predicted savings of 25 minutes (27.9 minutes estimated time versus 52.9 minutes actual time). Primary employers and designations at IH 20 and points further south are discussed below.

The Target Distribution Center located along IH 20 west of US 69 is the largest employer in Lindale, with approximately 725 employees in 2011. In 2013, FedEx Ground announced plans to build a 165,000 square-foot distribution facility at the Lindale Industrial Park on IH 20. The facility is expected to be a large source of employment in the area (see **Section VI.F.1**).

In Tyler, the University of Texas at Tyler and Tyler Junior College are the largest public employers. As of June 2007, major private employers in the Tyler Metropolitan Statistical Area include: Brookshire Grocery Company, Carrier Corporation (now Ingersoll Rand), Classic Cable (now Suddenlink), East Texas Medical Center, Goodyear Tire-Rubber Company (now closed), Howe-Baker Engineers Ltd. (now Chicago Bridge & Iron), Mother Frances Hospital, Target Corporation, Tyler Pipe Company, and Wal-Mart Associates, Inc. (TWC, 2007 with updates via personal communication from J. Goodwin, May 24, 2013).

Both build alternatives would decrease travel time to these locations because travelers would not have to stop at traffic signals and travel at reduced speeds through Lindale and along the increasingly congested US 69 south of Lindale.

Alternative D would require realignment of CR 4148 at US 69, closure of part of CR 4116, and the extension of CR 4117 at US 69 (see **Residential and Commercial Displacements, Plate 1**

in **Appendix A**). CR 4116 would terminate in a cul-de-sac just north of its intersection with the proposed reliever route; access for the remaining portion of the roadway north of the reliever route would be maintained via CR 4118. CR 4117 would be extended south of CR 4116 and would run parallel to the reliever route to connect with CR 4118. Access for CR 4116 south of the proposed reliever would be maintained via CR 4117. These changes would be made in a manner where all residents would continue to have access; however, displacements would be more numerous and disruption of travel patterns would be more severe with Alternative D. Alternative G would not require any county road realignments or closures near US 69. This route would have minor operational impacts on existing roads and would provide for minimal disruption to existing travel patterns during construction.

Access to properties currently fronting US 69 north of Lindale would be maintained by means of a shared driveway, to be located off of CR 4118. Currently landlocked parcels north of FM 16 and at the FM 16 interchange location would not have access provided by the project design; those properties would remain landlocked. Landlocked parcels between FM 16 and FM 849 would have access provided by a relocated CR 473 and a shared driveway off of CR 473.

Impacts to the Provision of Public Services

The proposed project would not displace any public facilities. No water or wastewater facilities would be impacted by the proposed project. Because the proposed project's purpose includes increasing mobility and safety through Lindale, there may be a positive impact on the use of public facilities or the ability to provide services.

Safety Impacts

The proposed improvements would increase safety for the residents of Lindale by diverting through traffic away from downtown. The decrease of through traffic on US 69 through Lindale may increase safety for non-motorists. In addition, the proposed project may have a positive impact on emergency response time for fire, police, and emergency medical personnel in certain situations (West, 2008). The positive benefits to public safety would be the same for both build alternatives.

Displacements

The effect of residential and commercial displacements can affect communities in several ways, depending on their number and type, whether they occur in neighborhoods, and the availability of acceptable relocation or replacement accommodations.

Alternative D would have more substantial displacement effects than the preferred Alternative G, requiring 18 residential relocations (10 single family and eight mobile homes) and six commercial displacements of various retail, service, and commercial establishments. Alternative G would require ten residential relocations (seven single family and three mobile homes) and one commercial displacement.

Neither alternative route would affect established neighborhoods, although Alternative D, with its north terminus nearer to developed areas of North Lindale, would require relocation of more clustered residences and commercial locations along CR 4116 and at the US 69 intersection. The northern terminus of Alternative G would affect fewer, more scattered residences to the north. Available replacement accommodations may be more difficult to obtain for Alternative D's displacements, as the residential units are generally of lower value and the commercial establishments tend to be somewhat specialized (e.g., fireworks retailer, septic services).

Addressing Impacts

The four methods for addressing impacts include avoidance, minimization, mitigation, and enhancement, which should be considered in that order (FHWA, 1996). The technically preferred alternative would impact the fewest residential relocations and would not impact any public facilities. Efforts were made to minimize residential relocations and impacts on businesses and public and community facilities. Mitigation in the form of relocation assistance is described in **Section IV.A.2.b**. Community enhancement measures are not included in the proposed project per se, although many of the benefits, such as safety and mobility, would be experienced by the local residents of Lindale and Hideaway.

IV.B.3. Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." FHWA has identified three fundamental principles of environmental justice:

- To avoid, minimize, or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations;
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority populations and low-income populations.

As defined by FHWA, "low-income" means a person whose median household income is at or below the Department of Health and Human Services (DHHS) poverty guideline for the current year. For 2013, the DHHS guideline is $23,550 for a family of four.

As defined by CEQ (1997), a minority population should be identified where either: (a) the minority population of the affected area exceeds 50 percent, or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

As defined by FHWA Order 6640.23A (2012), a minority person is someone who is:

- Black (having origins in any of the black racial groups of Africa);
- Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);
- Asian-American (having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent;
- American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition); or
- Native Hawaiian and Other Pacific Islander: a person having origins in any of the original peoples of Hawaii, Guam, Samoa or other Pacific Islands.

See **Section III.B** for demographic data, in addition to the discussion below.

IV.B.3.a Identifying Minority and Low-income Populations

The discussion in **Section III.B.1.b Population Characteristics** identified two Census blocks in CT 14.04 BG 2 which approached or exceeded the 50 percent threshold for minority population. Table 13 shows that Block 2095 had 55.9 percent minority persons and Block 2097 had 46.2 percent minority persons. These two blocks are therefore considered minority populations. As indicated on **Figure 8**, both of these blocks are located along US 69 near the northern termini of the proposed project Alternatives D and G. Census blocks in the demographic study area were also compared to Smith County as a reference area in order to apply the "meaningfully greater" consideration for identification of minority populations. Excluding Blocks 2095 and 2097, which have already been identified as minority populations, the percentage of minority persons in each block did not exceed that of Smith County (37.9 percent) by more than nine percent (see **Table 13**). Therefore, no additional blocks were added as minority populations based on a "meaningfully greater" consideration.

The smallest geographic unit for which household income Census data is available is the block group level. **Table 17** in **Section III.B.2.a** indicates that none of the demographic study area block groups had median family incomes that were less than or equal to the 2013 DHHS poverty guideline of $23,550. None of these block groups are identified as low-income populations, although it is possible that small clusters of residences or dispersed populations in the North Lindale area may qualify as low-income.

IV.B.3.b Potential Adverse Effects

Adverse impacts may occur in the form of residential relocations or other project-related effects related to air, noise, and water pollution and soil contamination; destruction or disruption of human-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of, benefits of FHWA programs, policies, or activities (FHWA, 2012). Residential relocations by the proposed project alternatives within the identified Environmental Justice (EJ) blocks are summarized in **Table 38**.

Table 38 Residential Relocations by Project Alternative/Census Block

	Relocations within Minority Census Blocks	Other Relocations	Total Relocations
Alt. D	6	12	18
Alt. G	0	10	10

No Build Alternative

The No Build Alternative would not require the acquisition of any right-of-way or any residential relocations or the displacement of commercial, public, or community facilities; however, the No Build Alternative would not fulfill the Need and Purpose of the project to reduce traffic and improve safety in the city of Lindale. There would be no EJ impacts under the No Build Alternative.

Build Alternative D

Alternative D would require 18 residential relocations and six commercial displacements. The residential relocations would occur in Blocks 2081, 2069, 2086, and 2095 of BG 2 in CT 14.04 and Block 4006 of BG 4 in CT 14.01. Six of the 18 residential relocations would occur in Block

2095 of CT 14.04, where the minority population is approximately 56 percent (see **Table 13**). These six relocations would also occur in CT 14.04 BG 2, which is not defined as low-income.

A number of homes and businesses near US 69 at CR 4117 would be displaced as a result of Alternative D (see **Residential and Commercial Displacements Plates 1-7** in **Appendix A**). A community facility, VFW Post 9828, would experience parking lot impacts. No other public facilities would be displaced by the proposed project. In addition to changes in travel patterns along FM 849, FM 16, CR 431 and US 69 during construction, Alternative D would require the realignment of CR 4148, the closure of a portion of CR 4116, and the extension of CR 4117 at US 69. These permanent changes would occur in minority block (Block 2095 of BG 2 in CT 14.04) and these effects are considered further in **Section VI.B.3.d**.

Build Alternative G

Technically preferred Alternative G would require ten residential relocations, one commercial displacement and no community facility displacements. The residential relocations would occur in Blocks 2069 and 2086 of BG 2 in of CT 14.04 and Block 4006 of BG 4 in CT 14.01. None of the relocations would occur in minority blocks or low-income block groups.

No concentrated communities would be relocated by the proposed Alternative G. The residences that would be relocated are individual rural homes (see **Residential and Commercial Displacements Plates 1-7** in **Appendix A**). No public facilities would be displaced by this alternative. With regard to construction impacts, changes in travel patterns during construction are expected to be limited to the roadways that would be crossed by the proposed project, including FM 849, FM 16, CR 431, and US 69. These impacts would primarily affect residents and businesses west of US 69.

IV.B.3.c Coordination, Access to Information, and Participation

Although no meetings were conducted specifically for the EJ populations, a number of general public meetings and affected property owner meetings were held in public settings in Lindale near the potentially relocated residences, and all affected property owners were notified and invited once reasonable alternatives were defined. A total of eight public meetings have been held over the history of the project and the three most recent meetings, held November 16, 2006, November 27, 2007, and June 10, 2008, were specifically oriented to affected property owners. Invitations were sent to the affected property owners, and separate meetings were held in order to address their concerns. They were also contacted and visited in person by Tyler District staff on an as-needed basis.

IV.B.3.d Identification of Disproportionately High and Adverse Effects

Disproportionately high and adverse human health or environmental effects are defined by FHWA (2012) as adverse effects that:

- Are predominately borne by a minority population and/or a low-income population; or
- Will be suffered by the minority population and/or low-income population and are appreciably more severe or greater in magnitude than the adverse effects that will be suffered by the non-minority population and/or non-low-income population.

While demographic information is not available at the household level, under Alternative D, six of 18 residential relocations would occur within a minority block (Block 2095 of BG 2 in CT 14.04). Considering that two-thirds of the relocations would occur in non-minority blocks, and there are no low-income block groups, this impact is not considered to be predominantly borne by a minority population. Two of the relocations are mobile homes; these could potentially be relocated to either another section of the affected parcel or to another lot in the area. If comparable housing is not available at the time of right-of-way acquisition, TxDOT would, if necessary, provide housing supplement payments in excess of the standard payment limits to ensure that decent, safe, and sanitary dwellings are made available to all eligible displacees. The six commercial displacements caused by Alternative D (see **Table 31**) are not located within the minority block and do not include any businesses essential to the well being of community members (institutions in this category would include food or clothing banks, shelters, adult day care, physical and mental health support). While travel patterns for residents residing on CR 4116 within the minority block would be changed, access to all parcels would be maintained (see Mobility and Access Impacts in **Section IV.B.2.b**). In light of these considerations, Alternative D would not cause disproportionately high and adverse impacts to the identified minority population.

Alternative G would not cause adverse effects to EJ populations; therefore, there are no disproportionately high and adverse effects on minority or low-income populations.

IV.B.3.e Project-Level Environmental Justice Toll Analysis

The build alternatives for the US 69/Loop 49 North Lindale Reliever Route are proposed as tolled facilities. According to FHWA/TxDOT (2009) joint guidance, proposed toll facilities must undergo an evaluation to determine anticipated effects on Environmental Justice populations within the region, including the impacts to travel time and/or out-of-pocket costs. The effects of the potential tolled lanes associated with Alternatives D and G on EJ populations within and beyond the demographic study area are addressed in the following sections. The presence of potential EJ populations among toll facility user groups is addressed first, followed by a description of tolling policies, including rates and collection policies. An assessment of

potential effects of tolling on low-income project users is then presented. This section concludes with an overview of regional EJ considerations related to other existing and proposed toll roads in the Tyler area.

Low-income Populations Among Potential Toll Road Users

In general, the economic impact of tolling is higher for low-income users because the cost of paying tolls would represent a higher percentage of household income than for non-low-income users. Therefore, household income is the most important variable in evaluating potential tolling effects on EJ populations. A previous draft of this document evaluated income levels based on Census 2000 data. Based on this earlier data, a block group whose median household income was not below the DHHS guideline, but was about $10,000 below the median income of its parent census tract was included in the assessment of potential impacts to low-income users as part of a reasonably conservative analysis.

Based on more current 2011 ACS data, the median household incomes of the demographic study area block groups are more evenly distributed and are also all nearly equal to ($40 less) or higher than the median incomes for the parent census tracts (see **Section III.B.2.a**). The median incomes of the demographic study area block groups also exceed those of Lindale and Smith County, and all exceed the 2013 DHHS poverty guideline by at least $25,000. Nonetheless, a study of the potential economic effects of the proposed facility to low-income users remains warranted. It is possible that small clusters of residences or dispersed populations in the demographic study area may be low-income, while other potential low-income toll road users may reside outside the demographic study area, throughout Smith County and beyond. The potential financial impact to these populations is analyzed below**.**

Description of Proposed Toll Facility and Toll Policies

Several alternatives were considered for the US 69/Loop 49 North Lindale Reliever Route. The alternatives development and screening process described in this DEIS resulted in the identification of Build Alternatives D and G for detailed study. In addition to the Build Alternatives, the No Build Alternative was evaluated for comparison.

Availability of Non-Toll Facilities

The proposed toll facility would not have continuous access roads, and access to the roadway is limited to US 69 in the north, FM 16 midway along the route, and IH 20 in the south. The non-toll alternative to the reliever route is the existing US 69 facility through Lindale.

Travel Time Differences Between Toll and Non-Toll Alternatives

Section IV.B.2.b Mobility and Access Impacts provides an estimate of travel time differences between existing US 69 (No Build) and the proposed reliever route (Build Alternatives D or G). Tyler District staff analyzed travel times for the fully completed Loop 49, measured from FM 16 (commute origin) and US 69 in south Tyler (commute destination), as well as for the proposed Lindale Reliever Route segment of the Loop. Under existing (2013) conditions, the estimated travel time for the full route using the existing US 69 is 52.9 minutes. Travel time calculated for the tolled Loop 49 from FM 16 to US 69 south of the city at the posted 70-mph speed limit is 27.9 minutes, a difference of about 25 minutes. Note that this estimate factors in travel delays due to signals, school zones, etc., along US 69 through the more congested, urban portion of Tyler, which lies outside the project area.

The travel time differential between the proposed Lindale reliever route (from FM 16 to IH 20) and its non-tolled alternative (US 69 from FM 16 to IH 20) is about seven minutes (14 minutes along existing US 69 vs. about seven minutes along the proposed tolled reliever). Under the No Build Alternative, travel times along the existing US 69 corridor are expected to get longer as traffic congestion increases over the planning period. **Section 1.B.1.c** notes that the level of service on US 69 in the city of Lindale is expected to decline from the current LOS A-B to LOS D in 2027 if the proposed reliever route is not constructed. With the proposed toll facility in place, traffic on US 69 through Lindale would remain at the current level of LOS A-B.

Policies Regarding Toll Rates, Collection and Payment

Toll policies are established by the NET RMA. Toll rates, collection practices, and other requirements would be the same as those in effect for Loop 49 South and West segments. The toll for the proposed facility is expected to be $0.10 per mile using electronic toll collection (TxTags) only. There would not be any toll booths on the proposed roadway. For users without a TxTag, a camera would photograph license plates and send users a bill plus a $0.15 processing fee. If bills are not paid, they would be turned over to a collection agency. The toll collection would be 100-percent electronic. The TxTags users must pay an initial one-time $20.00 fee. Users can pre-pay their TxTag account by mailing a check or money order to TxTag, P.O. Box 650749, Dallas, TX 75265-0749, or pay online at www.TxTag.org using a credit card. To pay in cash, users would have to visit the TxTag Customer Service Center in Austin. There would be no cost difference between toll tags purchased with cash vs. credit cards. Users would have the option to replenish their tags with debit cards or charge cards, or by check or money order via the TxTag mailing address listed above. There would be no monthly service charge. There would not be a free or discount option for low-income drivers. The toll policy does not currently provide for discounts for transit vehicles or motorcycles. As the interim phase of the proposed project would be comprised of one lane in either direction, there would not be an HOV lane.

Excess toll revenue from this project would be used to finance future expansion of the Phase I, two-lane facility to the Phase II, four-lane facility. Toll revenue in excess of that needed to finance Phase II could be used to finance other projects in the 12-county RMA area.

Potential Effects of Tolling on EJ Populations

The Executive Order (E.O.) 12898 term "disproportionately high and adverse effect" considers the totality of significant individual or cumulative human health or environmental impacts on minority populations and low-income populations. Toll roads can have a disproportionate impact on lower-income commuters if their workplaces are not accessible by transit; lower-income populations bear a disproportionate burden if they have to shift to congested roads to avoid the toll, and they may be priced out of discretionary trips (Prozzi, 2006). In addition, toll collection methods can also serve to restrict access to the facility or disproportionately burden low-income populations because of a lack of credit or the inability to maintain a prepaid account.

Although there are no identifiable low-income populations in the demographic study area based on current 2011 ACS data, low-income persons may still be among potential users of the proposed toll facility. Proceeding from this assumption, the following observations are made in order to evaluate the magnitude of the potential financial impact of using the toll route for a household at the 2013 DHHS poverty guideline ($23,550).

The proposed reliever route lies between 2.0 and 2.7 miles to the west of the nearest north-south parallel facility, the existing US 69, measured from likely commuter entrance or exit points at FM 16 and IH 20. Potential users may decide not to use the tolled reliever, due either to its distance from the free alternative or their inability or unwillingness to pay the toll. In either case, the result is likely to be increased travel times to commuter destinations for those individuals. If either of the proposed Build Alternatives is constructed, travel time in 2033 along US 69 from the proposed project's north terminus to IH 20 is expected to be less than it would be under the No Build Alternative due to the diversion of through-traffic and commuter traffic to the tolled reliever.

The potential economic impact to low-income individuals using toll facilities can up to an estimated at $370 per year, equivalent to 1.6 percent or more of their household income. This assumes: (1) a toll rate of $0.10 per mile; (2) travel along the full 7.4 mile length of Alternative G (3) household income is at the DHHS poverty guideline of $23,550; and (4) 500 tolled trips (250 round trips) per year (using the example in FHWA/TxDOT [2009] guidance). This economic burden compares with other reference groups as follows (**Table 39**):

Table 39 Toll Impact on Low-Income Population – Alternative D			
	Median Household Income by Reference Area		
	DHHS Low-income	Lindale	Smith County
$/year	$23,550	$45,676	$46,615
Annual toll	$350	$350	$350
Toll as % of income	1.49%	0.77%	0.75%

The table indicates that low-income users who drive the full length of the proposed facility on Alternative D for their every-day commute would devote approximately 1.5 percent of their income, compared with about 0.8 percent of income for non-low-income users in the other reference areas.

A similar calculation is made for preferred Alternative G, using the same assumptions except for project length, which is 7.4 miles (**Table 40**).

Table 40 Toll Impact on Low-Income Population – Alternative G			
	Median Household Income by Reference Area		
	DHHS Low-income	Lindale	Smith County
$/year	$23,550	$45,676	$46,615
Annual toll	$370	$370	$370
Toll as % of income	1.57%	0.81%	0.79%

The table indicates that low-income users who drive the full length of the proposed facility on Alternative G for their every-day commute would devote approximately 1.6 percent of their income, compared with about 0.8 percent of income for non-low-income users in the other reference areas.

Tolling may have some effect on travel decisions of some lower income residents. Both Build Alternatives would affect these populations nearly equally with respect to the potential economic impact of tolls on users. The No Build Alternative is projected to result in future increased travel times for all potential users. Either Build Alternative is likely to reduce future travel time on the existing US 69 compared with the No Build Alternative for all potential users.

Accommodations would be made to ensure access to the toll facility to LEP persons and other under-served elements of the population. For example, the TxTag website is available in Spanish and provides a customer service contact number for the deaf and hard of hearing.

Summary of Project-Level Environmental Justice Toll Analysis

If the proposed tolled reliever route project is constructed, potential low-income users who wish to commute to work or travel for any other reason would have a choice: (1) use the tolled reliever route, at a cost that would be equivalent to up to about 1.6 percent of their household income (assuming their annual household income is at the 2013 DHHS poverty guideline); or (2)

continue to use US 69 through Lindale, the parallel non-tolled alternative, which is expected to take about seven minutes longer, measured from FM 16 to IH 20, than the controlled access toll facility. For low-income persons who choose to use the tolled reliever route, payment may be made either by purchasing a TxTag for a one-time $20 fee with periodic account replenishment via credit card, debit card, check, or money order or by simply using the roadway subject to receiving a bill by mail, to which a $0.15 processing fee would be added.

If the proposed tolled reliever route is constructed, the level of traffic congestion on US 69 through Lindale is expected to remain at LOS A-B, with travel time assumed to remain more or less stable as well. If the reliever route is not constructed, traffic projections to 2027 indicate increased congestion (with proportionate increases in travel time) from LOS A-B to LOS D. Thus, lower predicted travel times on the non-tolled alternative for low-income persons who choose not to use the tolled facility may be viewed as a future offsetting benefit of the proposed action.

Based on the these relatively small proportional cost and travel time differentials between potential low-income users and other users of the proposed toll facility, it does not appear that the project-level toll impacts on potential low-income persons in the project area would be disproportionately high and adverse.

Regional Environmental Justice Considerations

There are two tolled or managed roadways currently in operation in the region, Loop 49 South and Loop 49 West. These projects are described in **Section VI.F.2**.

The Tyler Area MTP 2035 (Tyler Area MPO, 2010) does not include a network-level EJ analysis for toll roads. However, as the agency responsible for coordinating the regional transportation planning process, the Tyler Area MPO has sought to make sure that all segments of the population have been involved with the planning process, including the MTP, the transportation improvement program, and specific project planning.

The MTP identifies EJ populations by Census block groups within the urbanized planning region. From a regional perspective, the block groups having high (greater than 50 percent) minority populations are generally located in Tyler inside Loop 323, based on data presented in the MTP document. Low-income population areas similarly tend to be concentrated within Loop 323. The MPO has established policies and practices for addressing the service needs of EJ populations. These tolling policies and practices are generally consistent with those of the TxDOT Tyler District.

A Regional Toll Analysis will be completed by TxDOT and the Tyler Area MPO and included in the Final EIS to evaluate potential tolling effects on low-income and minority communities.

IV.B.3.f Environmental Justice Summary

Based on the above discussion and analysis, Alternatives D and G would not cause disproportionately high and adverse effects on any minority or low-income populations in accordance with the provisions of E.O. 12898 and FHWA Order 6640.23.

IV.C. Noise Effects

IV.C.1. No Build Alternative

The No Build alternative would result in gradually increasing noise along the existing US 69 roadway facility as traffic volumes continue to grow in the project area.

IV.C.2 Build Alternatives

The following analysis was accomplished in accordance with TxDOT's (FHWA-approved) Guidelines for Analysis and Abatement of Highway Traffic Noise dated April 2011 (TxDOT, 2011).

Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB." Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dB(A)."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

The traffic noise analysis typically includes the following elements:

- Identification of land use activity areas that might be impacted by traffic noise,
- Determination of existing noise levels,
- Prediction of future noise levels,
- Identification of possible noise impacts, and
- Consideration and evaluation of measures to reduce noise impacts.

The FHWA has established the following Noise Abatement Criteria (NAC) for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur (**Table 41**).

Table 41 FHWA Noise Abatement Criteria

Activity Category	FHWA dB(A) Leq	TxDOT dB(A) Leq	Description of Land Use Activity Areas
A	57 (exterior)	56 (exterior)	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	66 (exterior)	Residential
C	67 (exterior)	66 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools , television studios, trails, and trail crossings
D	52 (interior)	51 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72 (exterior)	71 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	--	--	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	--	Undeveloped lands that are not permitted.

NOTE: Primary consideration is given to exterior areas (Category A, B or C) where frequent human activity occurs. However, interior areas (Category E) are used if exterior areas are physically shielded from the roadway, or if there is little or no human activity in exterior areas adjacent to the roadway.
Source: TxDOT Guidelines for Analysis and Abatement of Roadway Traffic Noise. April 2011.

A noise impact occurs when either the absolute or relative criterion is met:

Absolute criterion: the predicted noise level at a receiver approaches, equals or exceeds the NAC. "Approach" is defined as one dB(A) below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dB(A) or above.

Relative criterion: the predicted noise level substantially exceeds the existing noise level at a receiver even though the predicted noise level does not approach, equal or exceed the NAC. “Substantially exceeds” is defined as more than 10 dB(A). For example: a noise impact would occur at a Category B residence if the existing level is 54 dB(A) and the predicted level is 65 dB(A).

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area.

The FHWA traffic noise modeling (TNM) software was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

Existing and predicted traffic noise levels were determined at receiver locations (**Table 42** and **Potential Environmental Constraints Plates 1-7** in **Appendix A**) that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement. These receiver locations were confirmed using the April 2013 Smith County Map Site data available online (Tyler GIS Department, 2013).

Table 42 Traffic Noise Levels (dB[A] Leq)

Representative Receiver	NAC Category	NAC Level	Existing (Field Measured)	Predicted Alt D - 2027	Predicted Alt G - 2027	Alt D Change (+/-)	Alt G Change (+/-)	Alt D Noise Impact	Alt G Noise Impact
R01 Residence	B	67	62	64	63	+2	+1	No	No
R02 Residence	B	67	62	63	63	+1	+1	No	No
R03 Residence	B	67	48	-	55	-	+7	-	No
R04 Residence	B	67	48	-	57	-	+9	-	No
R05 Residence	B	67	48	-	50	-	+2	-	No
R06 Residence	B	67	62	63	-	+1	-	No	-
R07 Residence	B	67	48	55	-	+7	-	No	-
R08 Residence	B	67	48	55	-	+7	-	No	-
R09 Residence	B	67	48	60	-	+12	-	Yes	-
R10 Residence	B	67	48	61	-	+13	-	Yes	-
R11 Residence	B	67	48	53	-	+5	-	No	-
R12 Residence	B	67	48	51	-	+3	-	No	-
R13 Residence	B	67	48	56	55	+8	+7	No	No
R14 Residence	B	67	48	54	56	+6	+8	No	No
R15 Residence	B	67	48	49	51	+1	+3	No	No
R16 Residence	B	67	48	51	58	+3	+10	No	No
R17 Residence	B	67	48	50	54	+2	+6	No	No
R18 Residence	B	67	48	50	55	+2	+7	No	No
R19 Residence	B	67	47	50	51	+3	+4	No	No
R20 Residence	B	67	48	54	54	+6	+6	No	No
R21 Residence	B	67	48	49	50	+1	+2	No	No
R22 Residence	B	67	48	51	51	+3	+3	No	No

As indicated in **Table 42**, noise impacts would only occur along Alternative D; there would be no noise impacts along Alternative G. Therefore, the following noise abatement measures were considered for Alternative D: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone and the construction of noise walls.

Before any abatement measure can be proposed for incorporation into the proposed project, it must be both feasible and reasonable. In order to be "feasible," the abatement measure must be able to reduce the noise level at greater than 50 percent of impacted, first row receivers by at least five dB(A); and to be "reasonable," it must not exceed the cost-effectiveness criterion of

$25,000 for each receiver that would benefit by a reduction of at least five dB(A) and the abatement measure must be able to reduce the noise level affecting at least one impacted, first row receiver by at least seven dB(A).

Traffic management: controls could be used to reduce the speed of the traffic; however, the minor benefit of one dB(A) per five mph reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

Alteration of horizontal and/or vertical alignments: any further alteration of the alignment would displace existing businesses and residences, require additional right-of-way and not be cost effective/reasonable.

Buffer zone: the acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

Noise walls: this is the most commonly used noise abatement measure. Noise walls were evaluated for each of the impacted receiver locations with the following results:

Alternative D, R09: This receiver represents a total of two impacted residences located adjacent to the south side of Alternative D main lane southwest of CR 4116 at CR 4117. Based on preliminary calculations, an on-structure noise barrier, 1,749 feet in length and an average of 10.17 feet in height would reduce noise levels by 5.0 and 5.5 dB(A) for two benefited receivers at a total cost of $320,227, or $160,114 per benefitted receiver. Since the noise barrier would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver and would also not reduce at least one impacted, first-row receiver by at least 7 dB(A), the barrier is not proposed for incorporation into this alternative.

Alternative D, R10: This receiver represents a total of three impacted residences located adjacent to the north side of Alternative D main lane immediately east of CR 4118. Based on preliminary calculations, an on-structure noise barrier, 853 feet in length and an average of 8.31 feet in height would reduce noise levels by between 5.0 and 6.3 dB(A) for three benefited receivers at a total cost of $127,511, or $42,504 for each benefited receiver. Since the noise barrier would exceed the reasonable, cost-effectiveness criterion of $25,000 per benefited receiver and would also not reduce at least one impacted, first-row receiver by at least 7 dB(A), the barrier is not proposed for incorporation in this alternative.

None of the above noise abatement measures would be both feasible and reasonable; therefore, no abatement measures are proposed for this proposed project.

To avoid noise impacts that may result from future development of properties adjacent to the proposed project, local officials responsible for land use control programs should ensure, to the maximum extent possible, that no new activities are planned or constructed along or within the following predicted (2027) noise impact contour (see **Table 43**).

Table 43 Year 2027 Predicted Noise Impact Contours

Undeveloped Area	Land Use	Impact Contour	Distance from Right-of-Way
Loop 49	Residential	66 dB(A)	32 feet

As there would be no toll booths, toll plazas, or toll-related grade separations, no noise impacts related to tolling are anticipated.

Noise associated with the construction of the proposed project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receivers are expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

A copy of this traffic noise analysis will be made available to local officials. After the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT would no longer be responsible for providing noise abatement for new development adjacent to the proposed project.

IV.D. Effects on Geologic Resources

IV.D.1. No Build Alternative

The No Build Alternative would not result in any impacts to geologic resources. If the No Build Alternative were implemented, sand/gravel would not be extracted as road sub-base. The No Build Alternative would not result in any impacts to prime farmland soils.

IV.D.2. Build Alternatives

Aside from the direct cut and fill impacts in and around travel lanes, bridges, and ramps, the proposed roadway project would have very little effect on the mineral resources of the area. Sand, gravel and road base material would be required in the construction process, but these resources are plentiful in the area. The construction of a new roadway would likely spur demand for aggregate, which could result in expansion of existing sites or creation of new sites; however, the materials required for construction of either of the build alternatives would not result in a

substantial impact to geologic resources. Mineral resources, other than oil and gas, located beneath the land areas required for the proposed project right-of-way would be used on site and/or stock-piled for other nearby projects. If oil and gas exist beneath the proposed project right-of-way, they could be reached by standard or directional drilling. This represents a very small portion of the total remaining resources available in the project area and Smith County.

Neither of the build alternatives would impact any oil/gas facilities. Two sand mining areas would be impacted by construction of the proposed project.

Alternative D would impact approximately 13.18 acres of prime farmland soils, and Alternative G would impact approximately 12.18 acres of prime farmland soils. Form NRCS-CPA-106 was completed for Alternatives D and G, and the resulting score was less than 60 for each alternative; therefore, coordination with the NRCS is not required. A copy of the completed forms are included in **Appendix E**.

IV.E. Air Quality Effects

IV.E.1. No Build Alternative

The No Build Alternative would result in gradually increasing MSAT emissions as traffic volumes increase and traffic congestion continues to worsen within the existing roadway system.

IV.E.2. Build Alternatives

The following analysis was conducted in accordance with TxDOT's most recent Air Quality Standards of Uniformity, dated March 2013 (TxDOT, 2013). The impacts on air quality would be similar for both build alternatives, as discussed below.

IV.E.2.a Project-Specific MSAT Information

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the build alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled "A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives," found at:
http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.pdf.

For both build alternatives in this document, the amount of MSAT emitted would be proportional to the VMT assuming that other variables such as fleet mix are the same for each alternative.

Because the VMT for the No Build Alternative is higher than for either of the build alternatives, higher levels of MSAT are not expected from either of the build alternatives compared to the No Build. In addition, because the estimated VMT under the build alternatives are nearly the same, it is expected that there would be no appreciable difference in overall MSAT emissions between the build alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent from 2010 to 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting from VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations.

Under both build alternatives there could be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the new roadway sections that would be built adjacent to the existing residential communities that front the project area. However, even if these increases did occur, they too would be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations. In addition, localized decreases in MSAT emissions would be lower in other areas where traffic shifts away from its existing location and toward the new roadway.

In sum, under the build alternatives in the design year, it is expected there would be reduced MSAT emissions in the immediate area of the proposed project, relative to the No Build Alternative, due to the reduced VMT associated with more direct routing, and due to EPA's MSAT reduction programs.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the IRIS, which is "a compilation of

electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of noncancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's 2009 Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents, which can be found at the following address: http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/100109guidmem.cfm. This Appendix also discusses a variety of FHWA research initiatives related to air toxics. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view. php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs. healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts–each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70-year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's MOVES model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in a National Cooperative Highway Research Program (NCHRP) study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country–three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model

performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://wwwcf.fhwa.dot.gov/exit. cfm?link=http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than one in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than one in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the described limitations in the methodologies for forecasting health impacts, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such predictions would not be useful to decision makers who would need to weigh this information against project benefits, such as reducing traffic congestion, a measure better suited for quantitative analysis.

Conclusion

In this document, a qualitative MSAT emissions assessment is provided for the Build and No Build Alternatives. The Build Alternatives may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

IV.F. Water Resource Effects

IV.F.1. Surface Water Quality

IV.F.1.a. No Build Alternative

The No Build Alternative would not cause any impacts to surface water quality.

IV.F.1.b. Build Alternatives

Surface water runoff from the project area drains to two stream segments that are classified as impaired according to the TCEQ's 2013 303(d) list: segment 0606 Neches River above Lake Palestine and segment 0606A Prairie Creek. Coordination with TCEQ would not be required because the proposed project does not cross and is not within five miles upstream of these impaired water segments.

The greatest potential for adverse impacts to surface water exists during the construction phase of the proposed project due to the quantity of soil being disturbed. The proposed project would disturb more than five acres of land; therefore, TxDOT and the contractor would be required to comply with the Texas Pollutant Discharge Elimination System (TPDES) General Permit for Construction Activities. This program seeks to control erosion and sedimentation from construction projects by means of the promulgation of a Stormwater Pollution Prevention Plan (SW3P) that must be written by the engineer or contractor and implemented prior to beginning construction. The program consists of both management and structural Best Management Practices (BMPs) such as use of vegetated roadsides in order to keep pollutants from entering receiving waters. These controls are required to be put in place to slow the flow of water from the site and prevent the loosening and transport of soil particles from the site during construction. In order to comply with the regulations, an engineer or contractor is required to keep the SW3P available for inspection at the construction site and submit the NOI to TCEQ prior to beginning construction. Following the completion of construction, a Notice of Termination (NOT) must be submitted by the District Office declaring that all BMPs were followed and that the proposed project was in compliance with the TPDES requirements. The proposed project would comply with all applicable measures mandated by these regulations.

No long-term water quality impacts are expected as a result of the proposed project. To minimize impacts to water quality during construction, the proposed project would utilize temporary erosion and sedimentation control practices outlined standard construction documents including TxDOT's guidance entitled Standard Specifications for the Construction of Highways, Streets, and Bridges. Where appropriate, these temporary erosion and sedimentation control structures would be in place prior to the initiation of construction, would be maintained throughout the duration of the construction, and left in place until vegetated cover is substantially in place.

Construction activities would require compliance with the State of Texas Water Quality Certification Program. The proposed project would impact more than three acres of waters of the U.S. (see **Section IV.G.2**). The Tier II 401 Certification Questionnaire and Alternatives Analysis Checklist would be completed and submitted to the TCEQ. Compliance with Section 401 of the Clean Water Act requires the use of BMPs to manage water quality on sites affecting jurisdictional waters. The SW3P would include at least one BMP from the 401 Water Quality Certification Conditions for Nationwide Permits (TCEQ, 2002). These BMPs would address each of the following categories: 1) erosion control, 2) post construction total suspended solids (TSS) control, and 3) sedimentation control.

BMP design decisions are not finalized at this time but would be chosen from TCEQ approved options and would be included in the TxDOT Environmental Permits, Issues and Commitments (EPIC) sheet for the proposed project. It is likely that temporary vegetation, sodding and/or mulching would be utilized for erosion control and silt fencing, stone outlet sediment traps and/or sediment basins would be used for sedimentation control.

IV.F.2. Floodplains

IV.F.2.a. No Build Alternative

The No Build Alternative would not result in any impacts to floodplains.

IV.F.2.b. Build Alternatives

Alternative D would cross approximately 6.17 acres of 100-year floodplains associated with Stevenson Branch and Davis Branch. Alternative G would cross approximately 23.64 acres of 100-year floodplains associated with Stevenson Branch and Davis Branch. The primary reason for this difference is the much longer floodplain crossing by Alternative G at the Stevenson Branch Crossing.

23 CFR 650.113 requires that significant encroachments on floodplains be the only practicable alternative which shall be supported by the following information:

- The reasons why the proposed action must be located in the floodplain;
- The alternatives considered and why they were not practicable; and
- A statement indicating whether the action conforms to applicable state or local floodplain protection standards.

The proposed project does not present a significant encroachment, as that term is defined in 23 CFR 650.113. There is not a significant potential for interruption or termination of a transportation facility needed for emergency vehicles or providing a community's only transportation route. The floodplain encroachments of the build alternatives do not represent significant risks or significant adverse impacts on natural and beneficial floodplain values. Given the topography and surface water hydrology of the project area, no alternatives were identified which would avoid floodplain impacts. The only alternative considered during the course of project development that would avoid encroachments on floodplains was the No Build Alternative. As indicated in **Chapter II**, the No Build Alternative would not satisfy the purpose and need for the proposed project. The proposed project would conform to state floodplain protection standards.

Corridor and alignment alternatives were developed to avoid and, if unavoidable, cross floodplains as much as practicable in a perpendicular manner to minimize floodplain impacts. In addition, alignment profiles were adjusted as practical to minimize fill heights and resulting permanent floodplain impacts. Preliminary hydraulic calculations provided the basis for determining minimum bridge length needs in floodplain locations.

Roadway encroachments on floodplains have been analyzed to determine any potential effects that could be caused by the Build Alternatives should a 100-year flood occur. The proposed fill associated with the Build Alternatives would not interrupt or terminate a transportation facility needed for emergency vehicles or community evacuation routes, nor would any changes in traffic patterns associated with the proposed project result in termination of such a facility or route. As a result of increased access provided by either of the proposed Build Alternatives, response times for emergency vehicles would be expected to decrease, while the number of evacuation routes available to communities would increase. No significant risks for floodplain encroachments that meet FEMA floodplain design requirements, and no significant adverse impacts on natural or beneficial floodplain values would be anticipated. Therefore, proposed floodplain impacts are considered to have no significant encroachment as defined in 23 CFR 650.

If the proposed project created an increase in the base flood elevation greater than one foot or causes any encroachment on a regulatory floodway, project engineers would be required to

notify all National Flood Insurance Program (NFIP) participants. Smith County is a participant in the NFIP. In this case, if the base flood elevation would be increased by greater than one foot, Smith County would have to grant approval before the proposed project would be allowed to proceed. If approved by Smith County, FEMA would then be notified. The notification to FEMA would include the proposed project's effects on the base flood elevations and any encroachments on the regulatory floodway. FEMA typically requires an engineering study to show the effects of the proposed project on the base flood elevation. Detailed hydraulic studies would be conducted during final project design and any required coordination with local officials would be accomplished prior to the initiation of construction.

E.O. 11988, "Floodplain Management," requires federal agencies to avoid actions, to the extent practicable, which result in the location of facilities in floodplains and/or affect floodplain values. The design of the proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. The hydraulic design for this proposed project would be in accordance with current TxDOT and FHWA policies and standards. The proposed roadway facility would permit the conveyance of the 100-year flood, inundation of the roadway being acceptable, without causing significant damage to the roadway or other property.

The Smith County NFIP floodplain administrator was one of the participating agency representatives that took part in meetings and participating during meetings that followed the FHWA approved Coordination Plan. In addition, a project meeting was held with the floodplain administrator on September 19, 2006, and an update meeting was held on April 29, 2013, during which support for the proposed project was expressed by the Smith County floodplain administrator. A memorandum of the most current meeting is included in **Appendix E.** Further coordination with the floodplain administrator would be conducted during the design development phase of the proposed project.

IV.F.3. Groundwater

IV.F.3.a. No Build Alternative

The No Build Alternative would not impact groundwater resources.

IV.F.3.b. Build Alternatives

No substantial impact to the quality or quantity of groundwater in the project area would be expected due to the construction of either of the proposed alternatives. One seep would be impacted by Alternative G; impacts to the seep are addressed in **Section IV.G.2.b**.

Consistent with the recommendation of the TCEQ, the TxDOT Tyler District should ensure that, prior to initiation of construction, drill holes resulting from core sampling on-site and down-gradient of the site be plugged from the bottom of the hole to the top of the hole, in order to prevent water or contaminants from entering the subsurface environment. In addition, any private water wells that occur within the proposed right-of-way should be plugged utilizing currently accepted methods in order to protect groundwater.

IV.G. Impacts to Ecological Resources

IV.G.1. Impacts to Vegetation

Effects to vegetation within the project area would involve the removal of trees and other vegetation as required to accommodate the proposed roadway's main lanes, shoulders, overpasses, drainage ditches, and safety clear zones. Existing native vegetation (i.e., upland and riparian forests and grasslands) provides erosion-inhibiting ground cover as well as habitat for many resident and migratory animal species; therefore, its loss through clearing can have negative effects to wildlife and water quality. Disturbed areas would be restored and reseeded according to the TxDOT specifications. This would be performed in accordance with TxDOT's "Seeding for Erosion Control," Executive Order 13112 on Invasive Species (64 FR 6183, February 8, 1999), and the FHWA Executive Memorandum on Environmentally Beneficial Landscaping. Reseeding and restoration species selection would balance the need for safety and vegetation diversity through appropriate consideration of plant species selection in safety clear zones.

IV.G.1.a. No Build Alternative

The No Build Alternative would not impact vegetation resources.

IV.G.1.b. Build Alternatives

Although efforts would be made to minimize vegetation impacts wherever possible, conservative estimates of impacts are presented below since exact construction techniques to avoid impacts cannot be predicted at this time. In these scenarios, Alternative D would result in the removal of a total of approximately 373.17 acres of vegetation, and Alternative G would result in the removal of a total of approximately 394.55 acres of vegetation. The acreage of each vegetation type impacted by each alternative is shown in **Table 44**.

Riparian zones that would be affected by the proposed build alternatives include those associated with Stevenson Branch and Davis Branch.

Table 44 Acreage of Impacted Vegetation for Each Build Alternative		
Vegetation Type	**Alternative D**	**Alternative G**
Upland Hardwood Forest	27.56	55.84
Pine Forest	22.23	20.22
Mixed Pine/Hardwood Forest	148.98	114.80
Riparian Forest	8.08	5.77
Grassland	166.32	197.92
Total	373.17	394.55

IV.G.2. Impacts to Waters of the U.S., Including Wetlands

IV.G.2.a. No Build Alternative

The No Build Alternative would not impact waters of the U.S. or wetlands.

IV.G.2.b. Build Alternatives

Highway construction activity in wetlands generally requires a Section 404 permit or permits from the USACE (see **Section III.G.3**). Executive Order 11990 (Protection of Wetlands, 1977) mandates that a project should avoid wetlands or, if no practicable alternative exists that avoids wetlands, impacts to wetland areas should be minimized as much as possible. FHWA guidelines for preparation of environmental documents require an evaluation of the importance of affected wetlands and the severity of potential impacts (FHWA, 1987). Wetland importance is assessed on the basis of primary function, relative importance in view of the total resource, and other factors, such as uniqueness, which may contribute to the wetland's importance. Based on their location in the watershed, principal functions of wetlands are flood control, associated water quality protection and wildlife habitat (Kusler, 1983). With respect to the relative importance of the forested wetlands in a regional context, none of the wetlands potentially affected by the proposed project alternatives are among those designated by the USFWS as important bottomland hardwood sites of ecological concern in the "Texas Bottomland Hardwood Preservation Program, Category 3" (USFWS, 1985). Forested wetlands of the type potentially affected by the proposed project are relatively abundant along the floodplains of creeks and streams in the region. None of the wetland sites or other waters of the U.S. identified along the project alternatives would be characterized as ecologically or hydrologically unique.

Both of the build alternatives for the proposed project would impact waters of the U.S. and wetland areas. It would be impossible to construct a roadway running north-south through the project area without crossing wetlands associated with the creek systems that flow through this part of Smith County. For the build alternatives, impacts to waters of the U.S. and wetlands would be direct and indirect, temporary and long-term. Direct impacts would include the alteration of the vegetation, soils, and hydrology. The vegetation would be mowed or removed in preparation for construction. The soils would be graded. Fill, in the form of additional soil, concrete, and road or bridge structures, would be added, depending on construction needs.

Heavy equipment would compact the soils, which often alters their drainage capability. The hydrology would be altered by changes in topography and vegetation, as runoff and drainage flow is diverted directly or indirectly during construction.

Proposed work in drainage channels could involve temporary fill material to be required during construction to allow machinery to access the channel. However, measures would be included to maintain preconstruction downstream flow rates.

The impacts of the proposed roadway on the flood control function of wetlands would be temporary. The roadway would be bridged and/or culverted for the majority of its span across the wetland sites and water of the U.S. crossings. Careful design and spacing of bridge supports and/or culverts would allow for unimpeded flow of flood waters under the spanned areas, even when peak flows carry logs and other debris. Thus, the existing hydrology and flood storage potential would not be substantially altered once construction has ceased and the remaining area has been returned to natural contours.

During construction of the proposed roadway, the majority of wildlife species that utilize project area waters of the U.S. and wetlands would be able to relocate temporarily, either upstream or downstream, to similar, as yet undisturbed wetland areas along the creek systems. It is expected that after construction has ceased and the waters of the U.S. and wetland areas have returned to approximately normal conditions, these wildlife species would return to their prior utilization of the remaining areas. Disturbed areas are expected to revegetate except where the soils have been severely or permanently affected (sterile fill or paving), provided that sufficient light and water are available after construction is completed. Whether or not the area returns to a wetland system would depend on the condition of the area after construction is complete. TxDOT specifications for revegetation, erosion/sedimentation control, and other restoration measures would be imposed during and after the construction phase.

A Memorandum of Agreement between the Environmental Protection Agency and the USACE (EPA, 1990) requires that the first steps in mitigation of impacts to waters of the U.S., including wetlands, be avoidance and/or minimization. For long-term water of the U.S. and wetland impacts that cannot be avoided or minimized, some form of compensatory mitigation may be required. The Section 404 permit for the proposed project would include conditions that dictate BMPs for construction in wetlands, restoration guidelines, and on-site compensatory planting. If on-site compensation is not practicable, additional off-site mitigation may be required. TxDOT has participated with the TPWD in the acquisition of the Anderson Tract, a bottomland hardwood tract in northern Smith County where high quality wetland resources have been "banked" for mitigation of unavoidable impacts associated with highway development. See **Section VII.B.1** for more detail on off-site mitigation via the Anderson Tract.

Impacts to waters of the U.S., including wetlands, within the project area for each build alternative are summarized in **Tables 45** and **46**. The numbered crossings are also depicted on **Potential Environmental Constraints Plates 1-7** in **Appendix A**. The potential impacts to waters of the U.S. (streams) were calculated by multiplying the Ordinary High Water Mark (OHWM) measured by the field delineations by the length lying within the project area, and converting to acres. The quality of each site was evaluated by survey personnel based on apparent wetland function or stream type, along with vegetative species diversity, age, and mast (i.e., "fruit of trees") production potential. High quality areas contained mature trees with good diversity and mast production potential. Medium quality areas were generally younger with less diversity and mast production potential. Low quality areas have little function or vegetative diversity and little if any mast production potential. Criteria for compliance with Nationwide Permit (NWP) 14 include a requirement that fill placed in single and complete crossings of waters of the U.S. total no more than 0.5 acre and Pre-Construction Notification (PCN) to the USACE be given for crossings with impacts greater than 0.10 acre or if there is a discharge in a special aquatic site, including wetlands. Impacts exceeding 0.5 acre require an individual permit (IP). Each of the crossings listed in **Tables 45** and **46** qualifies as a single and complete project.

Alternative D

Alternative D would impact seven single and complete crossings of waters of the U.S., including four adjacent wetlands (see **Table 45**). Four of the crossings (Crossings 4, 8, 9, and 10) would fall under NWP 14, with PCN to the USACE required for all of these. The remaining three crossings (Crossings 1, 6, and 7) would require Individual Permits.

Table 45 Jurisdictional Waters – Alternative D

Single and Complete Crossing Number*	Name of Feature	Type of Feature	Quality of Wetland Site	Mean OHWM (feet)	Acres within proposed ROW	Total Acres Impacted at Single and Complete Crossing	Permit Required
1	Stevenson Branch	Stream	NA	10	0.12	0.93	IP
		Adjacent Wetland A	High	---	0.81		
4	Tributary to Duck Creek	Stream	NA	4	0.11	0.11	NWP 14 w/PCN
6	Davis Branch	Stream	NA	14	0.14	1.65	IP
		Adjacent Wetland D	High	--	1.51		

Table 45 Jurisdictional Waters – Alternative D (continued)

Single and Complete Crossing Number*	Name of Feature	Type of Feature	Quality of Wetland Site	Mean OHWM (feet)	Acres within proposed ROW	Total Acres Impacted at Single and Complete Crossing	Permit Required
7	Tributary to Davis Branch	Stream (main channel)	NA	12	0.33	0.65	IP
		Stream (branch)	NA	3	0.02		
		Adjacent Wetland E (at branch)	High	--	0.30		
8	Tributary to Davis Branch	Stream	NA	3	0.09	0.13	NWP 14 w/PCN
		Adjacent Wetland F	High	--	0.04		
9	Tributary to Prairie Creek	Stream	NA	6	0.12	0.12	NWP 14 w/PCN
10	Tributary to Long Brake Creek	Stream (branch to west)	NA	6	0.09	0.14	NWP 14 w/PCN
		Stream (main branch to east)	NA	4	0.05		
Total					3.73		

*Water feature number corresponds to **Potential Environmental Constraints Plates 1-7** in **Appendix A**.

Alternative G

Alternative G would impact eight single and complete crossings of waters of the U.S., including five adjacent wetlands (see **Table 46**). Five of the crossings (Crossings 3, 5, 8, 9, and 10) would be covered under NWP 14; PCN to the USACE would be required for three of these crossings (Crossings 8, 9, and 10). Three crossings (Crossings 2 6, and 7) would require Individual Permits.

Table 46 Jurisdictional Waters – Alternative G

Single and Complete Crossing Number*	Name of Feature	Type of Feature	Quality of Wetland Site	Mean OHWM (feet)	Acres within proposed ROW	Total Acres Impacted at Single and Complete Crossing	Permit Required
2	Stevenson Branch	Adjacent Wetland B (north of stream)	Medium	--	2.40	4.17	IP
		Stream	NA	10	0.14		
		Adjacent Wetland C (south of stream)	Medium	--	1.63		
3	Seep	Seep	Medium	--	0.02	0.02	NWP 14

Table 46 Jurisdictional Waters - Alternative G (continued)							
Single and Complete Crossing Number*	**Name of Feature**	**Type of Feature**	**Quality of Wetland Site**	**Mean OHWM (feet)**	**Acres within proposed ROW**	**Total Acres Impacted at Single and Complete Crossing**	**Permit Required**
5	Tributary to Duck Creek	Stream	NA	6	0.08	0.08	NWP 14
6	Davis Branch	Stream	NA	14	0.15	2.07	IP
		Adjacent Wetland D	High	--	1.92		
7	Tributary to Davis Branch	Stream (main channel)	NA	12	0.33	0.65	IP
		Stream (branch)	NA	3	0.02		
		Adjacent Wetland E (at branch)	High	---	0.30		
8	Tributary to Davis Branch	Stream	NA	--	0.09	0.13	NWP 14 w/PCN
		Adjacent Wetland F	High	--	0.04		
9	Tributary to Prairie Creek	Stream	NA	6	0.12	0.12	NWP 14 w/PCN
10	Tributary to Long Brake Creek	Stream (branch to west)	NA	6	0.09	0.14	NWP 14 w/PCN
		Stream (main branch to east)	NA	4	0.05		
Total					7.38		

*Water feature number corresponds to **Potential Environmental Constraints Plates 1-7** in **Appendix A**.

IV.G.3. Impacts to Wildlife Resources

IV.G.3.a. No Build Alternative

The No Build Alternative would not impact wildlife resources.

IV.G.3.b. Build Alternatives

Trombulak and Frissell (2000) categorize roadway impacts to terrestrial and aquatic ecosystems into seven general areas: 1) increased mortality from road construction; 2) increased mortality from collision with vehicles; 3) modification of animal behavior; 4) alteration of the physical environment; 5) alteration of the chemical environment; 6) spread of exotic species; and 7) increased alteration and use of habitats by humans.

Construction phase activities would directly or indirectly affect most wildlife species present. Some sessile and/or slow moving species could be killed by heavy machinery during right-of-way clearing. Impacts to wildlife within the project area would also occur in conjunction with the removal of vegetation and disturbance in and around water features. Wooded areas provide

cover, food, and habitat for many resident and migratory species. Highway-related activities would cause direct disturbance of aquatic and terrestrial species found in riparian zones and highway runoff would cause longer term physical and chemical changes to area waterways. Direct mortality of wildlife species from vehicle collisions (road kill) is well documented and would likely be an effect with either of the proposed build alternatives, especially given the remote nature of the proposed project and due to the dissection and/or fragmentation of large blocks of forest. Arguably, the primary impacts to wildlife resources from projects of this nature (new location roadways through undeveloped, forested environments) are the effects of long term habitat loss. The removal of habitat has the effect of changing usage and movement patterns in many wildlife species and can disrupt small scale lifecycle movements, such as travel from uplands to wetlands during breeding season for amphibians.

In general terms, both build alternatives impact forested wildlife habitat types the most with Alternative D taking roughly 207 acres and Alternative G taking 197 acres of combined forest types. Of these forest types, the majority of the impacts are to mixed pine/hardwood forest with approximately 150 acres and 115 acres impacted by Alternatives D and G, respectively. Very little riparian forest is impacted by either alternative – approximately eight acres on Alternative D and six acres on Alternative G. Grassland habitat consists primarily of introduced pasture grasses such as coastal bermudagrass and bahiagrass; however, some areas of relictual native grasslands and oldfield areas are present. Combined grassland impacts are approximately 166 acres on Alternative D and 198 acres on Alternative G.

Generally, higher traffic volume corresponds to higher rates of wildlife mortality (Trombulak and Frissell, 2000). Mitigating factors include the fact that, when compared to more traveled highways, the proposed project would have fairly low traffic numbers and the design speed would be high, thus requiring increased line of sight clearing for safety purposes. This leads to lower mortality for many species as manicured right-of-way vegetation is less attractive and provides increased visibility for drivers and wildlife. The use of BMPs, careful vegetation clearing techniques, and replanting would also minimize impacts to wildlife habitat within the project area. Adjacent wildlife habitat would be protected from storm water runoff by implementing BMPs that would control erosion, post construction TSS, and sedimentation control. Native vegetation would be re-established where practicable to replace important forage and cover for wildlife. Riparian zones extending beyond the proposed right-of-way would be connected via bridging and culverts, so undisturbed areas near the project area can still provide suitable habitat for any displaced species.

All migratory birds in the U.S. are protected by federal statute, the Migratory Bird Treaty Act of 1916 (16 USC § 703-711). Migratory birds are protected from harassment, capture, possession, trade or sale, injury, and taking (killing) by this legislation. Habitat protection is not included in this statute. Migratory birds may arrive in the project area to breed during construction of the

proposed project. TxDOT would take measures to avoid impacts to migratory birds, ground nesting birds, their nests or their young. A primary strategy would include scheduling vegetation clearing in fall and early winter months to avoid impacts to nesting birds.

IV.G.4. Impacts to Threatened and Endangered Species

IV.G.4.a. No Build Alternative

The No Build Alternative would have no effect/impacts to any federally or state-listed threatened or endangered species.

IV.G.4.b. Build Alternatives

Neither build alternative would result in effects to federally listed threatened, endangered, or candidate species or their habitats. **Table 47** provides a list of rare, threatened and endangered species of potential occurrence in Smith County, Texas. In addition to their regulatory status and habitat preferences, a determination of whether appropriate habitat occurs in the project area is also included. Lastly, an effects/impact determination is also offered.

Table 47 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present?	Effects/Impact Determination
Plants					
Carrizo leather flower *Clematis carrizoensis*	NL	NL	Deep sandy soils; prairie areas of oak-hickory woodlands	Yes	The project area has deep sandy soils. The project may impact this species.
Panicled indigobush *Amorpha paniculata*	NL	NL	Acid seep forests, peat bogs, wet floodplain forests and seasonal wetlands on the edge of saline prairies in east Texas.	Yes	The project area has floodplain forest and seasonal wetlands. The project may impact this species.
Rough-stem aster *Symphyotrichum puniceum var scabricaule*	NL	NL	Relatively open sites in saturated soils associated with seepage areas, bogs, marshes, ponds, drainages, and degraded wetlands remnants on the Queen City, Carrizo, and Sparta sand formations	Yes	The project area contains open sites in saturated soil over Queen City, Carrizo, and Sparta sands. The project may impact this species.
Shinner's sunflower *Helianthus occidentalis ssp plantagineus*	NL	NL	Mostly on prairies on the Coastal Plain, with several slightly disjunct populations in the Pineywoods and South Texas Brush Country	Yes	The project area is in the Pineywoods and contains plains. The project may impact this species.
Texas trillium *Trillium texanum*	NL	NL	In or along the margins of hardwood forests on wet acid soils of bottoms and lower slopes, strongly associated with forested seeps and baygalls	Yes	Forested seeps are present within the project area. The project may impact this species.

Table 47 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)					
Species	**Federal Status**	**State Status**	**Description of Suitable Habitat**	**Habitat Present?**	**Effects/Impact Determination**
Mollusks					
Creeper (squawfoot) *Strophitus undulatus*	NL	NL	Small to large streams, prefers gravel or gravel and mud in flowing water; Colorado, Guadalupe, San Antonio, Neches (historic), and Trinity (historic) River basins	No	Project area streams are outside of the species' current range and do not have gravel substrates. The project would have no impact to this species.
Fawnsfoot *Truncilla donaciformis*	NL	NL	Small to large rivers especially on sand, mud, rocky mud, and sand and gravel, also silt and cobble bottoms in still to swiftly flowing waters; Red (historic), Cypress (historic), Sabine (historic), Neches, Trinity, and San Jacinto River basins	No	No rivers occur within the project area. The project would have no impact to this species.
Little spectaclecase *Villosa lienosa*	NL	NL	Creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along the banks in slower currents; east Texas, Cypress through San Jacinto River basins.	Yes	Streams with sandy substrates occur within the project area. The project may impact this species.
Louisiana pigtoe *Pleurobema riddellii*	NL	T	Streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins.	Yes	Streams with substrates of mud and sand occur within the project area. The project may impact this species.
Sandbank pocketbook *Lampsilis satura*	NL	T	Small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulphur through San Jacinto River basins; Neches River.	No	No rivers occur within the project area. The project would have no impact to this species.
Southern hickorynut *Obovaria jacksoniana*	NL	T	Medium sized gravel substrates with low to moderate current; Neches, Sabine, and Trinity River basins.	No	Project area streams do not have gravel substrates. The project would have no impact to this species.
Texas heelsplitter *Potamilus amphichaenus*	NL	T	Quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins.	Yes	Quiet waters in mud or sand occur in the project area. The project may impact this species.
Texas pigtoe *Fusconaia askewi*	NL	T	Rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sabine through Trinity Rivers as well as San Jacinto River.	No	No rivers occur within the project area. The project would have no impact to this species.

Table 47 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present?	Effects/Impact Determination
Wabash pigtoe *Fusconaia flava*	NL	NL	Creeks to large rivers on mud, sand, and gravel from all habitats except deep shifting sands; found in moderate to swift currents; east Texas River basins, Red through San Jacinto; elsewhere occurs in reservoirs and lakes with no flow.	Yes	Streams with substrates of mud and sand occur within the project area. The project may impact this species.
Wartyback *Quadrula nodulata*	NL	NL	Gravel and sand-gravel bottoms in medium to large rivers and on mud; Red, Sabine, Neches River basins.	No	Project area streams do not have gravelly substrates. The project would have no impact to this species.
FISHES					
Blackside darter *Percina maculata*	NL	T	Red, Cypress, and Sulfur River basins; clear, gravelly streams; prefers pools with some current, or even quiet pools, to swift riffles.	No	The project area is not within the Red, Cypress, or Sulfur River basins; therefore this project would have no impact to this species.
Creek chubsucker *Erimyzon oblongus*	NL	T	Found in tributaries of the Red, Sabine, Neches, Trinity, and San Jacinto Rivers, seldom in impoundments; prefers headwaters, but seldom in springs; young typically in headwater rivulets or marshes; spawns in river mouths or pools, riffles, lake outlets, upstream creeks.	Yes	The species could occur in project area streams. This project may impact this species.
Ironcolor shiner *Notropis chalybaeus*	NL	NL	Big Cypress Bayou and Sabine River basins; pools and slow runs of low gradient small acidic streams with sandy substrate and clear well vegetated water.	Yes	Streams with substrates of sand occur within the project area. The project may impact this species.
Orangebelly darter *Etheostoma radiosum*	NL	NL	Red through Angelina River basins; just headwaters ranging from high gradient streams to more sluggish lowland streams, gravel and rubble riffles preferred.	Yes	Headwater areas occur within the project area. The project may impact this species
Paddlefish *Polyodon spathula*	NL	T	Prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites; spawn in fast, shallow waters over gravel bars; larvae may drift from reservoir to reservoir.	No	No rivers or impoundments with access to spawning sites occur within the project area. The project would have no impact to this species.
Western sand darter *Ammocrypta clara*	NL	NL	Red and Sabine River basins; clear to slightly turbid water of medium to large rivers that have moderate to swift currents, primarily over extensive areas of sandy substrate	No	No rivers occur within the project area. The project would have no impact to this species.

Table 47 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)					
Species	**Federal Status**	**State Status**	**Description of Suitable Habitat**	**Habitat Present?**	**Effects/Impact Determination**
REPTILES					
Alligator snapping turtle *Macrochelys temminckii*	NL	T	Inhabits deep waters of rivers, canals, lakes, oxbows, swamps, bayous, ponds near deep running water; may migrate several miles along rivers; active March to October and breeds April to October.	Yes	Water bodies are found within the project area. This project may impact this species.
Louisiana pine snake *Pituophis ruthveni*	C	T	Mixed deciduous-longleaf pine forests; breeds April to September.	No	Mixed deciduous-longleaf pine forests do not occur within the project area. The project would have no effect to this species.
Northern scarlet snake *Cemophora coccinea copei*	NL	T	Mixed hardwood scrub on sandy soils, feeds on reptile eggs, semi-fossorial, active April to September.	Yes	Mixed hardwood scrub vegetation occurs within the project area. This project may impact this species.
Sabine map turtle *Graptemys ouachitensis sabinensis*	NL	NL	Sabine River system; rivers and related tributaries, ponds and reservoirs with abundant aquatic vegetation; basks on fallen logs and exposed roots.	Yes	Ponds and reservoirs with abundant aquatic vegetation are present in the project area. The project may impact this species
Texas horned lizard *Phrynosoma cornutum*	NL	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; sandy to rocky soil.	Yes	The project area does not contain open, arid areas with sparse vegetation; however, some areas of deep sands are present. This project may impact this species.
Timber/Canebrake rattlesnake *Crotalus horridus*	NL	T	Swamps, floodplains, upland pine and deciduous forests, riparian zones, abandoned farmland, limestone bluffs; sandy soil or black clay; prefers dense ground cover.	Yes	The project area contains floodplains, upland pine and deciduous forests, riparian zones, and sandy soils. This project may impact this species.
BIRDS					
American Peregrine Falcon *Falco peregrinus anatum*	DL	T	Nests in tall cliff eyries in west Texas; migrant across state from more northern breeding areas in U.S. and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban.	No	Potential migrant through the project area, but any use would be considered unlikely. The project would have no impact to this species.
Arctic Peregrine Falcon *Falco peregrinus tundrius*	DL	NL	Nests in tundra regions; migrates through Texas; winter inhabitant of coastlines and mountains from Florida to South America. Occupies wide range of habitats during migration, including urban; stopovers at leading landscape edges, usually near water.	No	Potential migrant through the project area, but any use would be considered unlikely. The project would have no impact to this species.
Sprague's Pipit *Anthus spragueii*	C	NL	Wintering migrant in TX; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size, avoids edges.	No	There are no native upland prairies in the project area. The project would have no effect to this species.

Table 47 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present?	Effects/Impact Determination
Bachman's Sparrow *Aimophila aestivalis*	NL	T	Open pine woods with scattered bushes or understory, on brushy or overgrown hillsides, overgrown fields with thickets and brambles, nests on ground against grass tuft or under low shrubs.	Yes	The project area contains open pine woods, brushy hillsides, and fields with blackberry and dewberry brambles. This project may impact this species.
Bald Eagle* *Haliaeetus leucocephalus*	DL,M	T	Nests and winters near rivers, lakes and along coasts; nests in tall trees or on cliffs near large bodies of water.	No	Potential migrant through the project area, but any use would be considered unlikely. Therefore, the project would have no effect to this species.
Henslow's Sparrow *Ammodramus henslowii*	NL	NL	Wintering individuals found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking.	Yes	The project area contains fields with blackberry and dewberry brambles and bare ground. This project may impact this species.
Interior Least Tern *Sterna antillarum athalassos*	E	E	Nests along sand and gravel bars within braided streams and rivers; also known to nest in man-made structures.	No	Potential migrant through the project area, but any use would be considered unlikely. Therefore, the project would have no effect to this species.
Piping Plover *Charadrius melodus*	T	T	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats.	No	Potential migrant through the project area, but any use would be considered unlikely. Therefore, the project would have no effect to this species.
Wood Stork *Mycteria americana*	NL	T	Forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds; breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.	Yes	The project contains wetlands, ponds, and ditches with shallow standing water and could provide foraging habitat. This project may impact this species.

Table 47 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)					
Species	**Federal Status**	**State Status**	**Description of Suitable Habitat**	**Habitat Present?**	**Effects/Impact Determination**
MAMMALS					
Black bear *Ursus americanus*	T/SA; NL	T	Inhabits bottomland hardwoods and large tracts of undeveloped forested areas, in Texas will inhabit desert lowlands and high elevation forests and forests, dens in tree hollows, rock piles, cliff overhangs, caves, or underbrush piles. Due to field characteristics similar to Louisiana Black Bear, treat all east Texas black bears as federal and state-listed threatened.	No	Due to habitat fragmentation and development, the project area would be unlikely to provide suitable habitat (remote tracts of undeveloped forested land greater than 2,500 acres) for a resident population of bears. Transient bears could potentially utilize forested areas as travel corridors, but such use would be considered unlikely and is unlikely due to nearby development. No sightings of black bears have been reported in Smith County since before 1977. The project would have no impact to this species.
Louisiana black bear* *Ursus americanus luteolus*	T	T	Large relatively remote blocks of land. They typically inhabit bottomland hardwood forests but also utilize brackish and freshwater marshes, salt domes, wooded spoil levees along canals and bayous, and agricultural fields.	No	Due to habitat fragmentation and development, the project area would be unlikely to provide suitable habitat (remote tracts of undeveloped forested land greater than 2,500 acres) for a resident population of bears. Transient bears could potentially utilize forested areas as travel corridors, but such use would be considered unlikely and is unlikely due to nearby development. No sightings of black bears have been reported in Smith County since before 1977. The project would have no effect to this species.
Plains spotted skunk *Spilogale putorius interrupta*	NL	NL	Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie	Yes	The project area contains open fields, forest edges and woodlands. This project may impact this species.
Red wolf *Canis rufus*	E	E	Formerly known throughout the eastern half of Texas in brushy and forested areas, as well as coastal prairies	No	This species is considered extirpated. The project would have no effect to this species.
Southeastern myotis bat *Myotis austroriparius*	NL	NL	Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures	Yes	The project area contains tree cavities of bottomland hardwoods. The project may impact this species

E – Endangered
T - Threatened
C –Candidate for Listing
DL – Delisted; DL, M – Delisted, Monitoring
T/SA - Threatened by Similarity of Appearance
NL - Not Listed; rare, but with no current regulatory protection

Table 47 Threatened and Endangered Species of Potential Occurrence in Smith County, Texas (continued)

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present?	Effects/Impact Determination

*These species occur on the U.S. Fish and Wildlife list of species potentially occurring in Smith County; all other species listed in this table are from the Texas Parks and Wildlife List of species of potential occurrence in Smith County

Sources:

Texas Parks and Wildlife Department. Annotated County Lists of Rare Species. Smith County (last revision 8/7/2012). Rare, Threatened, and Endangered Species of Texas http://gis.tpwd.state.tx.us/TpwEndangeredSpecies/DesktopDefault.aspx, accessed April 8, 2013.

U.S. Fish and Wildlife Service. Endangered Species List. List of Species by County for Texas: Smith County. Smith County (last revision 3/19/2013). http://www.fws.gov/southwest/es/ES_ListSpecies.cfm, accessed April 8, 2013.

Habitat for nine state-listed threatened species occurs within the project area for both of the build alternatives; these species include:

- Louisiana pigtoe,
- Texas heelsplitter,
- northern scarlet snake,
- timber/canebrake rattlesnake,
- alligator snapping turtle,
- creek chubsucker,
- Texas horned lizard,
- Bachman's Sparrow, and
- Wood Stork.

Habitat for 13 species considered rare by the state of Texas, but not provided any regulatory protection, occurs within the project area for both build alternatives; these species include:

- Carrizo leather flower
- Panicled indigobush
- Rough-stem aster
- Shinner's sunflower
- Texas trillium
- little spectaclecase
- Wabash pigtoe
- ironcolor shiner
- orangebelly darter
- Sabine map turtle
- Henslow's Sparrow
- plains spotted skunk
- southeastern myotis bat

Although habitat for these species occurs within the project area and individuals may be impacted by the proposed project, the project is not likely to negatively impact these species. The state-listed endangered American Peregrine Falcon (also federally considered de-listed,

monitoring) and state-listed threatened Arctic Peregrine Falcon and bald eagle (also federally considered de-listed, monitoring) could migrate through the project area; however, any use of the project area by these species would be considered unlikely. Avian impacts should largely be avoided through fall and winter vegetation clearing requirements; however, more vulnerable ground or water inhabiting species such as the mussels, reptiles, and fish listed above, would receive additional protection.

Neither build alternative would result in effects to federally listed threatened, endangered, or candidate species or habitat for any federally listed species. Habitat for the Louisiana pine snake, a candidate for federal listing, does not occur within the project area. The Interior Least Tern and Piping Plover, federally listed as endangered and threatened, respectively, may be potential migrants through the project area, but their preferred habitat is not present and any use would be considered very unlikely for that reason. Habitat for the Sprague's Pipit, a candidate for federal listing, is not present in the project area. The project area would be unlikely to provide habitat for the federally listed threatened Louisiana black bear or east Texas black bears (similarity of appearance). The proposed project would also have no effect on the red wolf, which is considered extirpated.

During construction, efforts would be made to avoid direct harm to individuals of state-listed or rare species; particularly those most vulnerable to earth moving and de-watering activities. Specific notes would be inserted into construction plans that indicate the potential presence of these species and instruct the contractors/workers to avoid impacting them. Contractors/workers would be briefed on the species appearance and habitat preferences prior to construction and instructed to cease activities in the vicinity of the protected species, if encountered, for a sufficient amount of time to enable escape or relocation. To avoid and/or minimize impacts to aquatic species, waterways would be spanned whenever possible and appropriate BMPs put in place. When areas must be de-watered, the work site would be isolated to prevent fish from moving into the construction zone and work activities in the channel conducted as quickly as possible to minimize the length of time that flow is modified or interrupted. Prompt and effective erosion control, re-vegetation and restoration of flow lines and grades should further minimize impacts and return the areas to pre-project conditions as soon as possible.

IV.H. Cultural Resource Effects

IV.H.1. No Build Alternative

The No Build Alternative would not result in any direct impacts to archeological sites or historic properties.

IV.H.2. Build Alternatives

IV.H.2.a. Impacts to Archeological Historic Properties

Alternative D

According to available archival and archeological survey data, if chosen for construction, Alternative D would impact a total of seven known archeological sites including three historic domestic sites and scatters, two prehistoric lithic and ceramic scatters, and two prehistoric lithic scatters (Hicks & Company, 2009). Two prehistoric archeological sites (Sites 41SM388 and 41SM393) and a landform initially interpreted as a potential platform mound were investigated as suggested in the initial survey report and were recommended as ineligible for listing in the NRHP or as SALs in a report submitted to TxDOT and the THC in October 2012. Agency responses regarding the recommendations for these sites are pending as of the date of this DEIS. Two remaining sites (Sites 41SM394 and 41SM395) still require NRHP/SAL-eligibility testing to assess the sites' composition and qualities relative to NRHP and SAL evaluation criteria; however, right-of-entry has not been granted to these properties. The three remaining sites along Alternative D have been determined to be NRHP/SAL-ineligible. Portions of Alternative D were not surveyed due to lack of right-of-entry.

Following the PA-TU with the THC, if right-of-entry is granted to the inaccessible portions of Alternatives D and G, these locations would be surveyed for archeological resources and newly identified and previously identified sites would be tested for NRHP/SAL eligibility, as necessary. If any sites are determined eligible, mitigative measures would likely be necessary.

Alternative G

If constructed, Alternative G would impact a total of six known archeological sites, including five historic domestic sites and scatters and one prehistoric lithic and ceramic scatter. The only site within the APE for Alternative G that was considered to be potentially eligible for listing in the NRHP or as an SAL (Site 41SM388) underwent further investigation and is recommended as NRHP/SAL-ineligible; however, concurrence with the results of this investigation by TxDOT and the THC is pending (as stated above). The remaining sites within the APE for Alternative G have been determined to be NRHP/SAL-ineligible. Portions of Alternative G were not surveyed due to lack of right-of-entry. Therefore it is possible that unrecorded archeological sites could be present in the currently inaccessible and unsurveyed portions of the proposed right-of-way. Further investigations cannot be conducted unless TxDOT obtains right-of-entry to or acquires the properties that have not been fully investigated in order to determine the potential effects of the proposed project on archeological resources within the APE. However, it is assumed that all necessary measures would be taken when possible to meet the requirements of the ACT and

Section 106. All investigations associated with the proposed project were conducted in accordance with the PA-TU and the MOU with the THC and TxDOT.

IV.H.2.b. Impacts to Historic Structures

Project historians located 30 historic-age sites, none of which are listed in or eligible for the NRHP. Therefore, neither Alternative D nor G would impact NRHP-eligible or listed properties.

IV.I. Hazardous Materials

IV.I.1. No Build Alternative

The No Build Alternative would not affect hazardous material sites.

IV.I.2. Build Alternatives

IV.I.2.1. Alternative D

The hazardous materials assessment indicated two potential hazardous materials sites located within the surrounding project area (see **Potential Environmental Constraints Plates** in **Appendix A**). These sites include Lindale Fertilizer and "junkyard property" adjacent to the south of the fertilizer facility. Both of these sites would be impacted by Alternative D. Further investigation should be undertaken during the right-of-way acquisition process in order to verify whether hazardous materials and/or related subsurface contamination are associated with these sites. If identified, any hazardous materials concerns would be addressed during the right-of-way process, including acquisition and eminent domain processes prior to construction. TxDOT would develop appropriate soil and/or groundwater management plans for activities in areas where contamination is expected to be encountered during construction. Any hazardous materials encountered during construction would be handled according to applicable federal, state, and local regulations through TxDOT Standard Specifications.

IV.I.2.2. Alternative G

Alternative G would not affect any known potential hazardous material sites.

IV.J. Visual Resource Effects

IV.J.1. No Build Alternative

The No Build Alternative would not change the existing landscape or aesthetics of the project area.

IV.J.2. Build Alternatives

The same design is proposed for both alternatives, with the exception of the bridge over Stevenson Branch. Alternative D would require a high 250-foot long bridge due to the hilly terrain in the area, while Alternative G spans the approximately 1,800-foot wide floodplain with a 250-foot long bridge and a roughly 1,550-foot long fill section. Cut/fill decisions used to minimize visual impacts of the proposed project are described in **Section IV.B.2.b**.

Both alternatives would require a right-of-way width of approximately 450 feet and would result in the removal of substantial native vegetation. Although estimates of removal of vegetation have been quantified conservatively, TxDOT would make reasonable efforts to preserve existing native vegetation wherever possible during construction. Vegetation restoration would use native species to the maximum practicable extent consistent with TxDOT specifications and the FHWA Executive Memorandum on Environmentally Beneficial Landscaping. The removal of vegetation on the level of a project of this nature would change the visual aesthetics of the area; however, the maintenance of native vegetation within the right-of-way, where feasible, would reduce the effect of the roadway and make it more compatible with the surrounding area. In addition, the existing topography and forested vegetation would aid in screening some of the visual impacts of the proposed project from the surrounding area.

IV.K. Energy Conservation Effects

IV.K.1. Energy Impacts

According to FHWA Technical Advisory T6640.8A Guidance for Preparing and Processing Environmental and Section 4(f) Documents, “detailed energy analysis including computations of BTU requirements” is not considered necessary “[e]xcept for large scale projects.” Instead, FHWA calls for a “reasonable and supportable” discussion regarding the energy requirements and conservation potential of the proposed project.

Energy consumption associated with the proposed project would include activities associated with the construction, operation, and maintenance of the Lindale Reliever Route. In most cases, “energy” needed for the proposed project indicates the amount of required petroleum to conduct

these activities. Energy consumption would occur during the construction phase of the proposed project (short-term) and after the completion of the proposed project by users of the new facility (long-term), in both direct and indirect scenarios.

Short-term impacts would include the consumption of energy during petroleum-dependent activities such as operation and maintenance of equipment used to build the proposed improvements, which would be directly attributable to the proposed project. Indirect short-term impacts would include energy-consuming factors such as commute by individuals participating in the construction of the proposed facility as well as temporarily increased travel time due to detours during the construction phase. These effects would be expected to be the same for both Alternatives D and G, since construction of either alternative would require similar levels of short-term energy consumption.

Long-term direct impacts related to the proposed project would include required energy for activities such as vehicle operation throughout the new facility. Energy consumption related to use of the proposed facility is dependent on vehicle efficiency, which includes such variables as roadway geometry, surface conditions, weather conditions, and traffic flows. With the reduction in future projected levels of traffic congestion in Lindale and improved mobility throughout the regional transportation system, the energy-consuming activities of both Alternatives D and G would have a less substantial impact than if the proposed project were not implemented. The proposed project would result in a net savings of operational energy, compared to the consequences of the No Build Alternative. Indirect energy impacts that would occur over the long-term for both alternatives would include activities such as the operation of facility-related signals and lighting, for which the energy requirements would be negligible.

The energy-related impacts of the proposed project would be expected to be the same for both alternatives, since there would be no substantial difference in construction- or operation-related energy requirements between Alternatives D and G. Short-term impacts for either alternative would likely have an adverse effect on energy consumption; however, these negative impacts would be offset by the expected decrease in energy consumption levels that would result from improved long-term operational conditions under either Alternative D or G, compared to the No Build Alternative.

IV.K.2 Mitigation of Energy Impacts

Nationwide measures such as the Energy Policy Act of 1992 (EPACT 1992 [Pub. L. No. 102–486]) and the Energy Policy Act of 1995 (ERACT 2005 [Pub. L. No. 109–58]) aim to "encourage use of non-petroleum alternative motor fuels to reduce dependence on imported oil in transportation" (USDOT, 2008). The EPACT 1992 outlines both mandatory and voluntary measures intended to promote replacement fuels in order to reduce dependence on imported oil

(42 U.S.C. 13211–13264). These efforts are further supported by the Energy Independence and Security Act (EISA) of 2007 and the Corporate Average Fuel Economy (42 U.SC. 7545(o)(2)(B) and 49 U.SC. 32902(b)(2)(A)), which increases standards in the Renewable Fuel Standard (established under EPACT 2005). Other initiatives such as TDM programs "seek to optimize the performance of local and regional transportation networks" through such activities as shuttle services, carpools/vanpools, telecommuting, and employer-based commuter choice programs (USDOT, 2008), which could in turn reduce overall energy requirements associated with projects such as the Lindale Reliever Route.

IV.L. Intermodal/Multi-modal Transportation Effects

IV.L.1. No Build Alternative

The No Build Alternative would not provide any new opportunities for intermodal or multi-modal transportation projects in the Lindale area.

IV.L.2. Build Alternatives

There is little difference between the build alternatives in regard to intermodal/multimodal effects of the proposed project. Due to the relatively small population of the city of Lindale and the Tyler area, and the circumferential nature of the Loop 49 project, opportunities are limited for intermodal or multi-modal operations. The proposed Lindale Reliever Route project would connect to the existing segments of the Loop 49 project, providing a connection to air transportation at Tyler Pounds Field. This connection would allow for an easier interchange from ground to air transportation for both passengers and freight. The mobility benefits of the proposed project are discussed in more detail in **Section VI.B.2.b Mobility and Access Impacts**.

In consideration of the U.S Department of Transportation's March 2010 policy statement on bicycle and pedestrian accommodations, TxDOT (2011) issued a Memorandum on the subject in March 2011. The proposed right-of-way would be approximately 450 feet wide (in order to accommodate extensive earthwork needed for the facility) (see **Figures 6a-c**), including a 76-foot wide depressed median. With a design including 10-foot shoulders, the proposed project would exceed the recommended five-foot shoulder recommended in the TxDOT Memorandum for projects in a rural setting. Neither the interim nor the ultimate design for the proposed project would preclude use of the roadway by bicyclists. The NET RMA, as operator, would regulate users of the facility, with safety in mind. Portions of the existing south section of Loop 49 are currently utilized by bicyclists; however, bicycle use is banned on Loop 49 West for safety reasons.

IV.M. Construction Phase Effects

IV.M.1. No Build Alternative

As there would be no construction under the No Build Alternative, there would be no construction phase effects.

IV.M.2. Build Alternatives

Construction of either of the proposed project build alternatives would have temporary impacts on air and water quality, vegetation and wildlife habitat, and social and economic conditions in the project area. These impacts would be temporary, and protection and restoration of affected resources would be undertaken through a number of regulatory programs and contractual requirements. Mitigation of construction phase impacts are addressed through TxDOT's Environmental Permits, Issues, and Commitments (EPIC) system, which ensures that mitigation commitments identified in the environmental impact assessment and permitting processes are implemented in the field (see **Section VII.B.3**). EPIC plan sheets must be included in the construction plan set. TxDOT has also established a number of construction specifications which provide guidance to design engineers and contractors for water quality, vegetation, and air quality protection and restoration.

IV.M.2.a. Air Quality Construction Emissions

During the construction phase of this proposed project, temporary increases in air pollutant emissions may occur from construction activities. The primary construction-related emissions are particulate matter (fugitive dust) from site preparation. These emissions are temporary in nature (only occurring during actual construction); it is not possible to reasonably estimate impacts from these emissions due to limitations of the existing models. However, the potential impacts of particulate matter emissions would be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling, covering loaded trucks, and other dust abatement controls, as appropriate.

The construction activity phase of this proposed project may generate a temporary increase in MSAT emissions from construction activities, equipment and related vehicles. The primary MSAT construction related emissions are particulate matter from site preparation and diesel particulate matter from diesel powered construction equipment and vehicles. However, gasoline or diesel emissions from heavy equipment are expected to have an insubstantial impact due to the low number of sources and the fact that they would be widely distributed over the site. Some components of diesel emissions are toxic at sufficiently high concentrations, but the concentrations of diesel exhaust at the proposed roadway construction sites are expected to be

very low and would pose no risk to public health or welfare. The MSAT emissions related to construction would be minimized by measures to encourage use of EPA required cleaner diesel fuels, limits on idling, increasing use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate. However, considering the temporary and transient nature of construction-related emissions, as well as the mitigation actions to be utilized, it is not anticipated that emissions from construction of this proposed project would have any substantial impacts on air quality in the area.

In addition, if burning is considered as a method of reducing or eliminating vegetation during proposed project construction, it would be subject to and would comply with TCEQ permit-by-rule requirements regarding types of equipment and methods and times of operation, as well as county-wide burn bans and other local regulatory restrictions.

IV.M.2.b. Noise Effects from Construction

Construction activities for the proposed roadway can be categorized into two basic activities: site preparation and roadway construction. It can be difficult to accurately predict levels of construction noise at a particular receptor or group of receptors. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. The duration of daily construction normally occurs during the daylight hours when occasional loud sounds are more tolerable. Since the exposure period imposed on any one receptor is relatively short, extended disruption of normal activities is not considered likely.

Stipulations in the project plans would require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work hour controls and maintenance of equipment muffler systems.

IV.M.2.c. Water Quality Effects from Construction

With respect to potential surface water contamination due to erosion and sedimentation, the critical time period occurs between the removal of existing vegetation to begin site work and the completion of construction and re-vegetation. There are numerous activities associated with construction that accelerate the rate of erosion; virtually all of these activities involve the removal of vegetation and/or the movement of soil to provide a construction site.

Without appropriate BMPs in place, sites and adjacent and downstream waterways can be seriously damaged by erosion and sedimentation. The most obvious damage is physical, where the effect can be seen as gullies or rills cutting across the affected area. Sediment loss resulting from erosion can provide a medium for unwanted vegetative growth in the waterway, resulting in slowing of the natural flow of water and deposition of more sediment. Subsequent to this

physical change, the ecological relationships in the water and the substrate are disrupted or destroyed.

The adverse impact on water quality can be reduced if construction activities are planned in keeping with the responsibility to protect water resources. The most effective method to accomplish this protection is to limit and phase the extent to which natural vegetation is disturbed. This method can significantly reduce the volume of material eroded from the site. Planning the necessary locations of disturbance and restricting construction traffic to those locations can greatly reduce overall damage to native vegetation and reduce erosion. Promptly revegetating any disturbed area at the end of the construction sequence also reduces erosion. To make this effective, construction and erosion control implementation activity should be planned to progress as rapidly and completely as possible to reduce the amount of time during which there is a high potential for erosion.

During the construction process, the use of erosion and sedimentation control strategies are important in reducing the effects of erosion. Common mitigation measures include the use of temporary holding ponds, silt fences, diversion dikes, rock berms, sediment containment basins, and re-vegetation. The effectiveness of these measures is dependent upon proper utilization of the technology. Silt fences, for example, are typically only useful if the contributing area is limited to about two acres or less. Diversion dikes and rock berms are effective for areas up to five acres, while sedimentation basins may be used for drainage areas up to 100 acres. The use of crushed stone access drives at specific points of ingress to the construction area would further reduce the amount of sediment transported offsite. Temporary slope stabilization practices, such as application or installation of straw mulch, mulch netting, or synthetic matting reduces sediment transport in sloped areas. As construction is completed for specific segments of the highway, re-vegetation would be performed to reduce the amount of time required to reestablish natural vegetative cover. These and other mitigation measures are addressed in TxDOT construction specifications, including those discussed later in this section. Protection of the water quality, recharge, flood control, ecological, and other functions of the natural drainageways adjacent to the proposed roadway would be a high priority in the detailed engineering design phase for the preferred alignment.

TxDOT construction phase specifications provide contractors and supervising engineers with detailed guidance for the implementation of protective measures. These include standard and special specifications for sodding for erosion control, seeding for erosion control, soil retention blankets, landscape planting, and temporary erosion, sediment, and environmental controls.

IV.M.2.d. Construction Impacts on Vegetation

Vegetation communities within the preferred alternative would be directly impacted by heavy machinery such as bulldozers. Clearing of vegetation would be minimized to the extent practical, but would be substantial within the proposed right-of-way and certain adjacent work areas. In addition to direct machinery impacts, adjacent vegetation can be affected by dust, erosion, and/or sedimentation if BMPs are not utilized throughout the period of peak disturbance prior to revegetation. Impacts to vegetation communities adjacent to the preferred alignment would be minimized through an efficient construction schedule and the implementation of BMPs. Efforts to mitigate vegetative impacts are discussed in **Section VII.B.1**.

IV.M.2.e. Construction Impacts on Traffic and Communities

The primary construction impacts to the traveling public and nearby residents consist of difficulties in the maintenance of traffic flow, disruption of the normal activities of residents and commercial establishments, and disruption of community cohesion during construction. Safety is a very high TxDOT priority for construction personnel, the travelling public, and community residents. Traffic flow would be strictly regulated through the construction areas. Additionally, access to adjacent properties would be maintained while the new roadway is constructed. If either of the Build Alternatives were selected, the proposed roadway would be on new right-of-way, and traffic flow on existing roadways would remain essentially unchanged during the construction period, with the exception of impacts to traffic flow associated with the realignment of CR 4148, the closure of CF 4116, and the extension of CR 4117 at US 69 under Alternative D (see **Section VI.B.2.b** for more information on the local effects of these county road modifications).

IV.N. Relationship Between Local Short-term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

Implementation of the proposed project would have a number of effects for both project alternatives, but not for the No Build Alternative. The operation of construction machinery and equipment would cause short-term effects on surrounding populations, including elevated noise levels, traffic interruption, and safety risks, dust and hydrocarbon emissions and potential pollution of surface waters due to sedimentation in runoff from exposed construction sites. Lands adjacent to the proposed roadway would be affected by construction access and staging of equipment. These impacts are localized, subject to mitigation, and are not expected to last beyond the construction phase.

Longer-term effects on the productivity of resources within the roadway corridor include the removal of approximately 423 to 427 acres of taxable property from the tax rolls of Smith County and the local school districts. The majority of this land is currently used for agricultural purposes, such as livestock grazing and hay production. The potential for future agricultural production within the project area would be lost with the conversion of this land to transportation uses. The loss of taxable property is expected to be offset over the long term by toll revenue and the increased values of land adjacent to intersections with the new roadway corridor. Additionally, the construction of the technically preferred alternative is expected to generate approximately 742 jobs statewide and approximately $33 million in earnings and $112 million in statewide economic output over the construction term (**Table 36**).

Either of the build alternatives would involve short-term impacts, such as relocation of residences, due to construction and operation of the proposed project. The need for the proposed project is centered on congestion and mobility problems which translate to safety problems that would only be exacerbated with growth in the region. The Lindale Reliever Route is a solution that has been evaluated by local, state and federal officials and stakeholders and is an integral component of local and regional transportation planning. Improving safety and congestion conditions along existing US 69 would demonstrate important steps toward longer term productivity and orderly development. These steps translate to quality of life improvement which, along with job creation, offset short term environmental impacts. The build alternatives are consistent with state and local plans, programs, and policies to improve overall access to the area over the long term. Thus, the short-term impacts associated with the build alternatives are consistent with the maintenance and enhancement of long-term productivity for the state and local area.

IV.O. Irreversible and Irretrievable Commitment of Resources

Construction of any of the build alternatives involves the commitment of a range of natural, human, physical, and fiscal resources. Land used in the construction of the facility is an irreversible commitment during the foreseeable future while the land is used for transportation purposes. A total of 373.2 acres (Alternative D) or 394.5 acres (Alternative G) of land in various land cover categories would be converted to transportation use over the long term. Some of this land could be restored or converted to other uses over the long term if it becomes necessary or desirable. Between 3.73 acres (Alternative D) and 7.38 acres (Alternative G) of waters of the U.S. including wetlands would be irreversibly committed by project construction across Stevenson Branch, Duck Creek, Davis Branch, Prairie Creek, and their tributaries. These losses would be subject to compensatory mitigation through the Section 404 permit. Off-site compensation would also be considered for irreversible commitments of riparian forest habitat within the proposed project right-of-way of 8.1 acres (Alternative D) and 5.8 acres (Alternative G).

Large amounts of fuel, labor, steel, cement, and rock aggregate are expended for the type of facility studied. These materials are not generally retrievable. These materials are not in short supply and their use is not expected to adversely affect their continued availability. State and federal funds expended for project planning and construction are not retrievable.

These commitments of resources are based upon the position, supported by state and local plans and policies that citizens in Lindale, Tyler and the northeast Texas region would benefit for an extended time period from an improved transportation system. These benefits include improved mobility and access, increased safety, and time savings and are intended to outweigh the costs required to implement the facility.

IV. P. Summary of Project Impacts

A summary of potential impacts of the No Build and Build Alternatives is presented by resource category in **Table 48** below.

Table 48 Summary of Environmental Consequences

Resource Impacted	Quantity/Nature of Impact		
	No Build	**Alternative D**	**Alternative G**
Land	No direct impacts, though if the Reliever Route is not constructed, existing roadways would need to be improved to alleviate congestion	Conversion of 423.15 acres of existing land uses to transportation use	Conversion of to 427.5 acres of existing land uses to transportation use
Community Quality of Life	No acquisition of property or displacements, though congestion conditions would continue to deteriorate, and required future improvements to US 69 would be costly in terms of dollars and traffic disruptions	Relocation of 18 residences and 6 businesses; removal of property from local tax rolls; temporary localized effects (detours, traffic delays) on community quality of life during construction; potential environmental justice concerns	Relocation of 10 residences and 2 businesses; removal of property from local tax rolls; temporary localized effects (detours, traffic delays) on community quality of life during construction; potential environmental justice concerns
Water Resources, Including Waters of the U.S. and Wetlands	No impacts to surface water quality, floodplains, groundwater, waters of the U.S. or wetlands	Seven crossings of waters of the U.S. including 4 wetlands affected; 6.17 acres of floodplains occur within the proposed right-of-way; potential changes in hydrology, flow characteristics; increased TSS in storm water runoff (construction phase)	Eight crossings of waters of the U.S. including 5 wetlands affected; 23.64 acres of floodplains occur within the proposed right-of-way; potential changes in hydrology, flow characteristics; increased TSS in storm water runoff (construction phase)

1

Table 48 Summary of Environmental Consequences (continued)			
Resource Impacted	**Quantity/Nature of Impact**		
	No Build	**Alternative D**	**Alternative G**
Vegetation	No impacts to vegetation resources	373.17 acres of vegetation removed, including 206.85 acres of forest vegetation	394.55 acres of vegetation removed, including 196.63 acres of forest vegetation
Wildlife	No impacts to wildlife resources	Habitat loss or alteration; displacement of wildlife	
Threatened or Endangered Species	No effects/impacts to any federally or state-listed threatened or endangered species	No T&E species or habitat for federally listed species directly affected. Some potential habitat for state-listed species impacted.	
Soils/Farmland	No impacts to prime farmland soils	Conversion of 13.18 acres of prime farmland soils to transportation use; soil compaction in some areas within right-of-way	Conversion of 12.18 acres of prime farmland soils to transportation use; soil compaction in some areas within right-of-way
Hazardous Materials	No impact to hazardous materials sites	Potential to impact 2 hazardous materials sites; use of potential contaminants (fuel, solvents) and generation of solid waste during construction; roadway pollutants in runoff during operation	No impact to any known potential hazardous materials sites; use of potential contaminants (fuel, solvents) and generation of solid waste during construction; roadway pollutants in runoff during operation
Noise	Gradually increasing noise along the existing US 69	Two noise impacts, as defined by FHWA, from roadway operation; temporary construction phase noise effects	No noise impacts, as defined by FHWA, from roadway operation; temporary construction phase noise effects
Air Quality	Gradually increasing MSAT emissions as traffic volumes increase and traffic congestion continues to worsen within the existing roadway	Area expected to remain in attainment under NAAQS standards; MSAT emissions for all alternatives expected to remain the same or decrease due to EPA's National Control programs; potential fugitive dust from construction activities	
Historic Resources	No impacts to historic resources are anticipated		
Archeological Resources	No impacts to archeological sites	Impact 7 archeological sites; four potentially NRHP/SAL-eligible sites*	Impact 6 archeological sites; one potentially NRHP/SAL-eligible site*

2 *Concurrence by TxDOT and the THC with the recommendations made in the October 2012 report regarding the ineligibility of Sites
3 41SM388 and 41SM393 is pending. If TxDOT and the THC agree with these recommendations, then Alternative D would impact
4 seven archeological sites, three of which would be considered potentially NRHP/SAL-eligible, while Alternative G would impact six
5 archeological sites, none of which would be considered potential NRHP/SAL-eligible.

V. Indirect Effects

The preceding sections of this Draft EIS have described the proposed project and its direct effects on the environment. It has long been recognized, however, that major transportation projects can also have important indirect effects on land use and the environment—effects that may occur after completion of or at some distance away from the project. It is also accepted that a project's effects, which may be individually minor, may be cumulatively important when added to the effects of other projects or developments in the area.

The following chapters will address the potential indirect (**Chapter V**) and cumulative (**Chapter VI**) effects of the proposed project. Although these types of effects are similar in many ways, they are analyzed separately in this document because of some important differences, which are addressed in the definitions in **Section V.A**, below. The indirect effects analyses in this Draft EIS relies on TxDOT's current guidance document, Revised Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2010), as well as National Cooperative Highway Research Program (NCHRP) documents, Report 466: Desk Reference for Estimating Indirect Effects of Proposed Transportation Projects (NCHRP, 2002) and Project 25-25 Task 22: Forecasting Indirect Land Use Effects of Transportation Projects (NCHRP, 2007).

This section begins by defining some key terms used in assessing environmental effects. The detailed indirect effects analysis follows the TxDOT-recommended (2010) seven-step framework. The section concludes with a summary of the potential indirect effects of the proposed project alternatives, including the No Build alternative.

V.A. Definitions

Direct Effects – Under the CEQ definition, direct effects are "caused by the action and occur at the same time and place" (40 CFR § 1508.8). Direct effects are predictable; they are going to happen as a result of the proposed project.

Examples of direct effects include right-of-way acquisition resulting in the conversion of existing land use (residential, agricultural, commercial, etc.) to transportation use, or removing wildlife habitat to clear the way for a new road. The direct effects of the proposed project are described in **Chapter IV**.

Indirect Effects – As defined by the CEQ, indirect effects are "caused by an action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR § 1508.8).

There are three general categories of indirect effects:

- Encroachment-alteration effects – alteration of the behavior and functioning of the affected environment caused by project encroachment (physical, chemical, biological) on the environment;
- Induced growth effects, or project-influenced development effects – the land use effect; and
- Effects related to project influenced development effects – the effects of change in land use on the human and natural environment.

"Indirect effects can be linked to direct effects in a causal chain" (TxDOT, 2010). Examples of indirect effects are listed in **Table 49**.

Table 49 Examples of Indirect Effects

Project Action	Direct Effect	Indirect Effect
Bypass highway	Improved access	Farmland converted to residential use. New residences produce new labor force, attracting new businesses.
New light rail	Improved access	New businesses open, producing jobs/taxes. Traditional businesses/residences priced out.
New highway	Improved access	Development alters character of historic area. Visitors increase to historic area.

Source: NCHRP Report 466, Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects, Transportation Research Board (2002).

Reasonably Foreseeable – Reasonably foreseeable means the effects are "sufficiently likely to occur that a person of ordinary prudence will take them into account in making a decision" (TxDOT, 2010). Reasonably foreseeable events must be probable, not just possible. Probability also helps distinguish indirect effects from direct effects: direct effects are often inevitable, while indirect effects are merely probable. "Effects that can be classified as possible but not probable may be excluded from consideration" (TxDOT, 2010).

Cumulative Effects – Cumulative effects are defined as effects on the environment "which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 CFR 1508.7).

V.B. Method of Analysis

The indirect effects analysis for the proposed project generally follows the seven-step process described in TxDOT's revised 2010 guidance. These steps include:

- Scoping
- Identify the Study Area's goals and trends

- Inventory the Study Area's notable features
- Identify impact-causing activities of the proposed alternatives
- Identify potentially substantial indirect effects
- Analyze indirect effects and evaluate results
- Assess consequences and consider/develop mitigation (when appropriate)

V.B.1. Step 1: Scoping

The main objectives of the indirect effects scoping process are to determine (1) the level of effort and general approach required to complete the study, and (2) the location and extent of the indirect effects study area, also referred to as the area of influence (AOI) (TxDOT, 2010) (see **Figure 12**). The scoping step also determines the types of indirect effects potentially resulting from the project (encroachment-alteration, induced development, or effects related to induced development) and whether detailed analysis of those effects is warranted.

V.B.1.a Indirect Effects Scoping Issues and Methods

The initial scoping step of the indirect effects analysis considers the following questions:

- Does the project need and purpose have an explicit economic development purpose?
- Will the project conflict with local plans?
- Is the project planned to serve specific land development?
- Is the project likely to stimulate land development having complementary functions?
- Is the project likely to influence intraregional land development location decisions?
- Are notable features present in the impact area?
- Are notable features substantially impacted?

Because the design and alignments of Alternatives D and G are similar (except for the northern portion), the potential indirect effects of the two alternatives are also similar. Where the alternative alignments diverge in the north, variations in indirect effects are noted, as appropriate. The following discussion addresses the above scoping questions.

The project need and purpose statement does not include an explicit economic development purpose. The statement does include the goals of improving transportation system linkage, highway capacity, and regional mobility, which are broadly related to long-term economic benefits for local communities and the Tyler region. For example, relieving traffic congestion on US 69 through downtown Lindale would further the City of Lindale's plan to revitalize the downtown area and maintain the "Main Street" atmosphere of the area; these goals are compatible with the community's long-term economic and quality of life-related goals. Lindale's current Second Century Comprehensive Plan (City of Lindale, 2004) integrates the proposed project into its future land use plan (**Figure 13**), and the proposed project is included in

the Tyler Area MPO's 2035 MTP (Tyler Area MPO, 2010) and the 2013–2016 STIP (Tyler Area MPO, 2012).

The proposed project is not planned to serve any specific development. Because the proposed reliever route would be a controlled-access roadway, indirect land development effects would mostly be associated with complementary functions (highway-oriented businesses such as gas stations, restaurants and hotels) near planned intersections with existing roadways (IH 20, FM 16, and US 69). At other road crossings within the project area (i.e., at FM 849), continuous access roads would not be present along the roadway, and new access would not be created. Some increase in the rate of residential development activity in the west Lindale area may result from the proposed project due to decreased travel time to and from Tyler.

The presence of notable features within the AOI is addressed in Step 3 (**Section V.B.3**). The scoping process reveals that of all the human and natural resources within the definition of "notable features," a smaller subset of resources—water resources, agricultural and timber production land, wildlife habitat, and minority population groups—could be substantially impacted and are therefore relevant to the project's indirect effects analysis.

The methods and degree of quantification of impacts in the indirect effects analysis vary depending on the type of project, setting, availability of data, and other scoping issues addressed above. The proposed project is likely to stimulate complementary (highway-oriented) development and some residential land development. Therefore, analysis of induced growth effects and effects related to that growth are included within the scope of the indirect effects analysis. The potential for indirect effects on notable features also indicates the need for encroachment-alteration analysis.

Because the Lindale Reliever Route project is a new location roadway, use of quantitative measures of analysis within the AOI are appropriate when quantifiable data are available. When quantifiable data are not available, qualitative judgments are relied upon to assess the possible extent of indirect effects. Given the level of uncertainty in predicting future growth for potential residential development throughout the AOI, it was determined that quantification of indirect land use effects would appropriately be limited to complementary development at interchanges.

For the purposes of forecasting induced growth effects, available methods range from reliance on the qualitative judgments of local planners and other key sources to quantitative land use models. The appropriate methodological approach depends on a number of variables, including the relative size of the project, the extent of likely induced travel, local plans and policies, and the presence of controversy concerning the proposed project, among others (NCHRP, 2007). Given the circumstances of the proposed project, the planning judgment approach was determined to be the most appropriate. The analysis relies on currently available land development data and

expertise and judgments of professional planners and local officials in Lindale and Hideaway. Given the 25-year planning horizon for the analysis, the recommendation to address "probable, not possible" future development was an important consideration. Interviews with local land use and development professionals were conducted during the 2008 DEIS development period. The findings from those sources were updated in 2012 through a collaborative judgment workshop held in Lindale and again, as appropriate, in 2013. This process and the participating planning and land use professionals are identified in Step 6, **Section V.B.6**.

V.B.1.b Determination of Study Area Boundaries

The study area for the analysis of indirect effects, the AOI, is depicted on **Figure 12**. The area is bounded by CR 452 to the north; US 69 and the floodplain of Prairie Creek to the east; IH 20 to the south/southeast; and CR 4119, the floodplain of Duck Creek and the western boundary of Hideaway to the west. The AOI was determined based on areas and population segments that would have fairly direct access to the proposed project and that would benefit from the ability to bypass downtown Lindale, those who expressed a great deal of interest in the project, and those whose interests were indicated in discussions with local officials. The AOI encompasses 13,797 acres of primarily undeveloped land. The timeframe for the analysis is from 1999, when the studies for this project began, to 2035, the planning horizon for the current MTP.

V.B.2. Step 2: Identify the Study Area's Goals and Trends

The objective of this step is to gather information on the general trends and goals of the study area, including community planning goals, demographic and development trends, factors influencing growth, and areas of environmental or social sensitivity. The description of goals and trends is derived from the City of Lindale's planning documents, local and/or regional trend data collected for the proposed project area, and interviews with local planners.

V.B.2.a Local Goals and Trends

According to the City of Lindale's web page, the community possesses a positive outlook on its current and future growth potential:

> Today, Lindale sits at the crossroads of Interstate 20 and Highway 69 and is located less than 30 minutes from Tyler Pounds Regional Airport, about 80 miles east of Dallas, and 75 miles west of Shreveport. It is poised for explosive retail and residential growth. In a city where more than 100,000 cars pass through each day, Lindale is attracting strong business partnerships. Its outstanding school system, proactive community calendar, recreational amenities, and affordable cost of living make Lindale a praised city in which

> to work and to live. Lindale is quickly delighting the discerning retiree who seeks the calm of the country life. (City of Lindale, 2009).

The City of Lindale's strong pro-growth goals have largely been based on objective economic development data over the period from 2000 to 2012. Growth in Lindale increased markedly after 2000, when the Target distribution center opened along IH 20. Between 2000 and 2008, approximately 100 homes have been built per year. The number of commercial building permits demonstrated similar growth; examples include hotels, big-box retailers, and shopping centers. The pace of economic development slowed during the 2008–2010 national economic recession. After a record high the previous year, sales tax receipts (the measure used by the Lindale Economic Development Corporation [EDC] to track economic activity) for FY 2009-2010 declined to the level of FY 2006-2007. The following years (FY 2010-2011 and 2011-2012), sales tax receipts have rebounded, achieving successive record highs for FY 2010-2011 and FY 2011-2012 (Clary, personal communication, April 2013).

Most commercial development has occurred around the US 69/IH 20 interchange, but with development also spreading north towards downtown Lindale. Since 2005, the US 69 corridor approximately one mile north of IH 20 has experienced new retail development, including Lowe's, Wal-Mart, fast food restaurants, and a new hotel. A new office park and at least two strip retail centers have been completed in this area during the 2000–2012 period.

V.B.2.b Local/Regional Development Plans and Regulations

The City of Lindale prepared the Lindale Second Century Comprehensive Plan as it approached the centennial anniversary of its official incorporation in 1905. According to the plan, "The community has attempted to articulate its collective vision of the future in this long-range planning document" (City of Lindale, 2004). The 2004 Lindale Second Century Comprehensive Plan includes a Future Land Use Map for the planning area (**Figure 13**), which includes Lindale's city limits and ETJ. The Future Land Use Map depicts the proposed US 69 Reliever Route/Loop 49 as a controlled-access thoroughfare mostly within the western ETJ boundary. The map delineates the intended type, location and extent of future land uses. The City has not updated its comprehensive plan as of April 2013.

While the predominant land use in the plan is low/medium-density residential, areas near the southern terminus of the proposed project are planned for mixed-use, transportation/distribution center, institutional/planned development, and high-density residential. Much of the area adjacent to the proposed project is designated as the "Loop 49 Corridor." According to the plan:

> The area is visually attractive due to its topography and forests. It is intended that the corridor maintain a natural appearance through uses that include large open spaces.

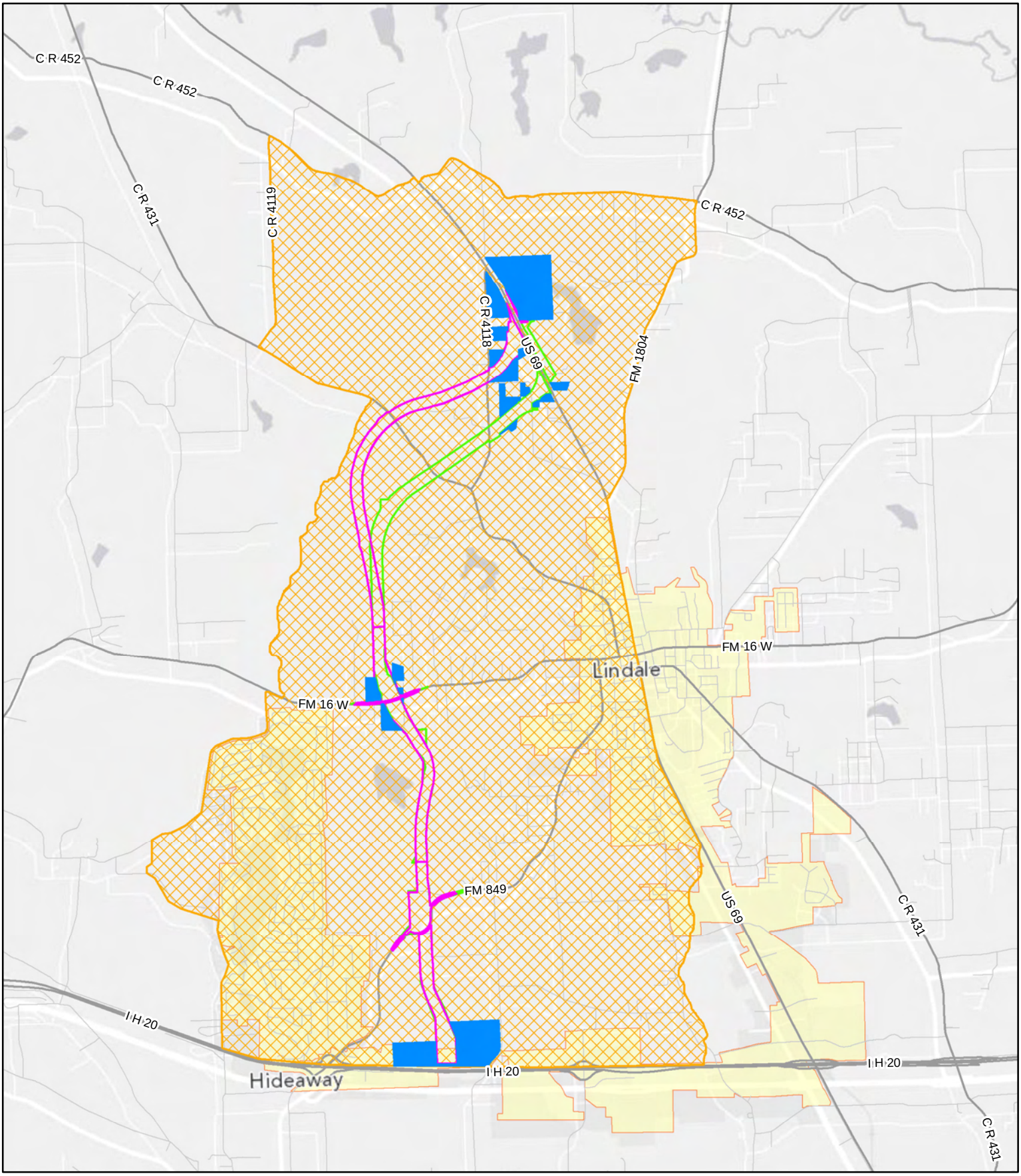


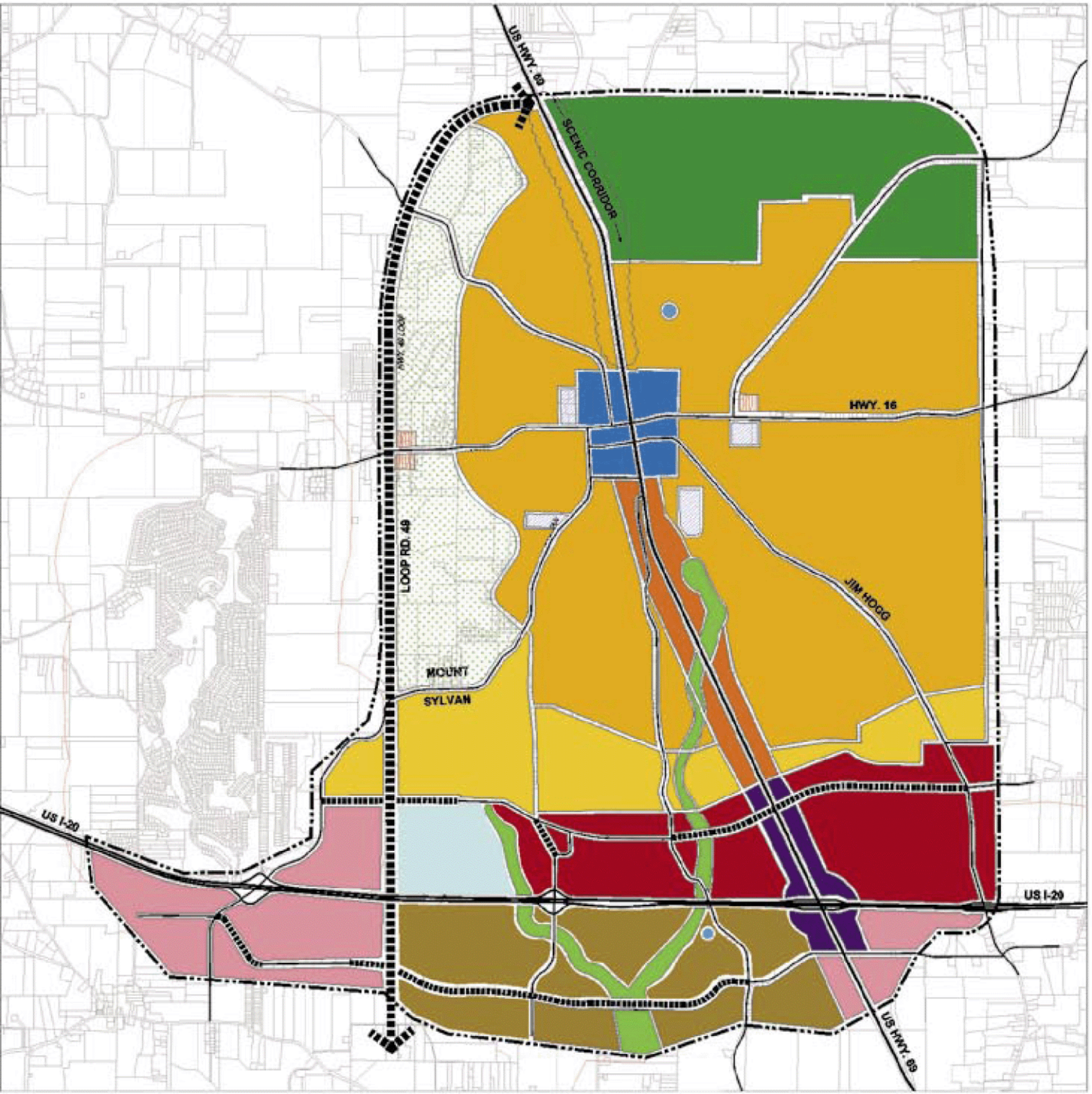
Figure 12

Area of Influence for Indirect Effects

LINDALE SECOND CENTURY
COMPREHENSIVE PLAN

Future Land Use Map

Figure 13



Source: RM Plan Group , GS&P - 2004

Legend

- Conservation Buffer
- Loop Road 49 Corridor
- Farmstead & Agricultural
- Low/Medium Density Residential
- High Density Residential
- Transportation/Distribution Center
- Downtown Mixed Use
- Waste Water Treatment
- Institutional/P.D.
- School
- I-20/Hwy. 69 Gateway
- US 69 Corridor
- I-20 North Parallel Corridor
- Mixed Use Center
- Neigborhood Commercial
- Existing Thoroughfare
- Proposed Thoroughfare
- Proposed Loop Rd. 49 Ltd. Access Thoroughfare
- Planning Area Boundary

> There are two existing private camps in the area that include large open space. A golf course residential development is ideally suited to the area. Residential development should be clustered in order to provide private open space. It is intended that this corridor will have an average density of about one unit per acre. (City of Lindale, 2004)

According to the 2004 plan, the City's goals with respect to planning and community design include:

- Prepare for growth by strengthening the community's land development policies and regulations;
- Preserve historic integrity of the community while accommodating new, high quality growth;
- Expand the city's retail sales tax base;
- Attract new good-paying industrial jobs;
- Determine the need for and location of a new City Hall;
- Explore opportunities for utilizing nearby lakes as long-term sources of water;
- Enhance downtown's role as the heart of the community and a crossroads activity center;
- Enhance the appearance of the US 69 corridor; and
- Provide an attractive and unified appearance at the IH 20/US 69 gateway.

The Tyler Area MPO's 2035 MTP (2010) defines transportation systems and services throughout the AOI. The MTP addresses regional transportation needs that are identified through current and forecasted future travel demand, developing and evaluating system alternatives, and selecting those options which best meet the mobility needs of the region. The proposed Lindale Reliever Route is included in this plan (see **Appendix E**).

Project area goals will be compared with the potential impacts of the proposed project in Step 5.

V.B.3. Step 3: Inventory the Study Area's Notable Features

TxDOT (2010) describes the term "notable features" as specific valued, vulnerable, or unique elements of the environment. Notable features may include:

- Sensitive species and habitats – ecologically valuable species and habitat, as well as those that are vulnerable to impact;
- Valued environmental components – "attributes of the environment that society seeks to use, protect, or enhance" (Irwin and Rodes, 1990);
- Valuable landscape components – those with relative uniqueness, long recovery times after disturbance, and unusual landscape features; and
- Vulnerable elements of the population – can include the elderly, children, disabled persons, and members of low-income or minority groups.

The identification of notable features within the AOI for the proposed project took into consideration:

- Constraints mapping performed at the inception of the project;
- A survey of resource priorities by the participating agencies;
- Input from the public at public meetings; and
- Information from **Chapter III Affected Environment** and **Chapter IV Environmental Consequences**.

During the project scoping process, the state and federal cooperating agencies had the opportunity to identify additional ecological and socioeconomic resources that should be given priority in the DEIS assessment. TPWD placed highest emphasis on any parkland or public open space within the AOI along with wildlife habitat, especially bottomland and/or riparian forest area; native grassland and/or Post Oak Savannah; and any possible occurrences of federally listed threatened or endangered species. TPWD also noted that the presence of potential hazardous material sites within the AOI, which include the closed City of Lindale landfill and an adjacent unpermitted dumping site, should be included for initial review as potential notable features. The uncertainties involved in roadway construction over these unregulated disposal sites were important considerations in the screening of preliminary corridor alternatives during project planning (described in **Section II.C.3**), which led to Preliminary Corridors E and F not being included for consideration as reasonable alternatives in the DEIS.

Focusing on the natural and human resources specific to the AOI, the notable features analysis was narrowed to the following:

- Water resources – Streams within the AOI include Stevenson Branch, Davis Branch, Prairie Creek, Long Brake Creek, their tributaries and associated wetlands. In addition, due to underlying geology/soils and hydrology, the potential exists for seeps and springs to occur in the AOI. These resources are valued environmentally as a major component of the ecosystem.

  A total of approximately 3.73 acres (Alternative D) to 7.38 acres (Alternative G) of water resources would be impacted within the project area. According to NRCS data, there are 8,600 acres of water resources (including streams less than 660 feet wide and water bodies less than 40 acres in size) present in Smith County (NRCS, 1997). Because only a small proportion of the water resources available in the county would be impacted, these impacts would be considered relatively minor.

- Agricultural and timber production land – Undeveloped land used for agriculture, particularly livestock production, and/or timber production comprises the majority of the land uses within the project area.

Within the project area, approximately 166.32 acres (Alternative D) to 197.92 acres (Alternative G) of grassland, much of which is used for livestock (primarily cattle) and hay production, and approximately 196.63 to 206.85 acres of forestland would be removed. The NRCS (1997) states that 261,800 acres of land in Smith County is forestland, and, according to the USDA, there are 1,362 farms in Smith County that are involved in the production of cattle and 49,969 acres of land are used for the production of forage crops, such as hay (USDA, 2002). The impacted agricultural and timber resources in the study area represent only a small portion of the resources present within the county. Thus, impacts to agricultural and timber production land in the project area would be minor.

- Minority community – The area to the west of US 69 near the northern termini of Alternatives D and G includes a residential area of mixed single-family homes and mobile homes. The two census blocks in the demographic study area with a minority population percentage approaching or exceeding 50 percent (Blocks 2095 and 2097 in BG 2, CT 14.04) are located in this area.

  Under Alternative D, six of the 18 residential relocations would occur in block 2095, a minority block. This block would also experience permanent changes in traffic patterns and increases in noise and air pollutants. It appears that Alternative D would have an impact on a minority population. Alternative G would have fewer relocations (none of them in minority blocks) and changes to traffic patterns, and would have fewer impacts to the minority population. To determine whether this minority population may be substantially impacted, a detailed analysis of encroachment-alteration effects for this notable feature is required.

V.B.4. Step 4: Identify Impact-Causing Activities of Proposed Action and Alternatives

The purpose of this step is to describe and list the aspects of project design, construction, and operation that may result in impacts to the environment. The Project Impact-causing Activities Checklist provided by TxDOT (2010) was used as a guide to identify component actions/activities that the proposed project would entail. Ten general categories of project impact-causing activities are described below, along with examples of specific actions associated with new location roadway development.

- Modification of Regime – includes alteration of habitat, flora, hydrology, or other features. Ground cover within the right-of-way would be removed. Surface drainage would be altered due to construction within the right-of-way. Structural water quality treatment devices would be located at the road's primary runoff points. Noise and

vibration would result from construction equipment trenching, excavation, backfilling, grading, and pavement laying activities. This category and several others below involve exposure of erodible materials to surface runoff.

- Land Transformation and Construction – includes construction elements, methods, ancillary elements (such as utilities), barriers, and drainage feature modifications. A new location transportation facility would be constructed, which would necessitate cut and fill activities throughout the project limits. Erosion control devices would be implemented and maintained until construction is complete. Sedimentation control devices would be maintained and remain in place until completion of the proposed project. Post-construction TSS control devices would be implemented upon completion of the proposed project.

- Resource Extraction – excavation and dredging – surface and subsurface excavation would be performed throughout the project limits, to construct the new roadway.

- Processing – storage of supplies -- temporary storage facilities are usually required during construction. Stored materials typically include aggregate, concrete pipes, traffic control barricades, steel rebar, road signs, etc. These are commonly co-located with temporary construction office trailers that are equipped with temporary utility service including some means of sanitary waste disposal. These are commonly located in the TxDOT right-of-way in the project limits.

- Land Alteration – landscaping and erosion control -- these would be among the soil disturbing activities that would occur throughout the project right-of-way with the same risks discussed under the first item above.

- Resource Renewal – remediation, reforestation -- the proposed project would not involve these activities, although disturbed soils would be reseeded or sodded. Some areas of the project side slopes outside of clear zone areas could be designated non-mow and allowed to reforest naturally over time from surrounding native plant sources.

- Changes in Traffic (including adjoining facilities) – traffic patterns on project and adjoining facilities. The primary effect would be the diversion of through traffic to the reliever route, thereby decreasing the projected rate of increase traffic on the existing US 69 through Lindale. Automobile and truck traffic at project intersections would temporarily be disrupted during the construction phase. The proposed project is not anticipated to require any detours from the existing route of existing roads crossed by the proposed roadway. Alternative D would require major closure and realignment of several county roads; Alternative G would not result in the major closure or realignment

of county roads. In most cases, access to properties along these county roads would be maintained by the creation of a shared driveway.

- Waste Emplacement and Treatment – landfill, waste discharge -- the proposed project would generally not involve these activities. Cleared vegetation would likely be mulched or burned on-site rather than transferred to a solid waste facility. Burning as a method of reducing or eliminating vegetation during proposed project construction would be subject to and would abide by TCEQ outdoor burning regulations, county-wide burn bans and other local regulatory restrictive actions (including those related to air quality).

- Chemical Treatment – fertilization, deicing -- When used, fertilizers are only used during the re-vegetative phase of TxDOT construction, but the use of fertilizers in the right-of-way is then discontinued. TxDOT principally uses inert sand materials for ice control, and these are only applied on bridges and pavement over culverts.

- Access Alteration – changes in access, circulation patterns, and travel times - The proposed project is intended to reduce congestion on US 69, improve safety and traffic operations, and reduce travel time in the region. Construction of the new roadway would also result in changes in access, including partial closure of CR 4116, realignment of CR 4148, and extension of CR 4117 that would result from Build Alternative D (see **Section IV.B.2.b** for further description of changes in mobility and access). Alternative G would not result in substantial county road closures or realignments. For both Build Alternatives, access to the reliever route via ramps would only be available at the intersections with US 69, FM 16, and IH 20; however, the restriction of access would increase safety for the high-speed roadway, and the travel time between Lindale and Tyler would decrease. Improved traffic flow could also increase the attractiveness for development of some areas within the AOI.

V.B.5. Step 5: Identify Potentially Substantial Indirect Effects for Analysis

Step 5 is a screening step which narrows a larger set of possible indirect impacts down to those which have potential to substantially affect resources and require mitigation. Questions suggested by TxDOT (2010) for this screening process include:

- How likely are the identified impact-causing activities (Step 4) to result in adverse indirect effects considering their magnitude, probability of occurring, timing, duration, or degree to which they might be controlled or mitigated?
- How would these impacts be evaluated in light of the area's goals (Step 2)?
- In the context of the above factors, how would these impacts affect important notable features (Step 3)? The objective of this step is to explore the relative importance of potential cause-effect relationships in order to establish which effects are potentially

substantial and merit subsequent detailed analysis (or conversely, which effects are not potentially substantial and require no further assessment).

Table 50 provides a summary of Steps 2 through 5 of the indirect effects analysis. The table relates the direct effects of the project alternatives identified in **Chapter IV** with impact-causing activities (Step 4) and potential indirect project effects, which are categorized as either encroachment-alteration (E-A) or induced growth effects (IG). The table further addresses consistency with study area goals (Step 2) and determines whether the indirect effects involve notable features (Step 3). Finally, where notable features are affected, the potential importance of those effects is addressed (Step 5) by indicating what further analysis will be required in Step 6.

V.B.6. Step 6: Analyze Indirect Effects and Evaluate Results

The purpose of this step is to assess the significance of the effects identified in Step 5 by determining the magnitude, probability of occurrence, timing, duration, and degree to which the effect can be controlled or mitigated. As shown in **Table 50**, potentially significant indirect impacts include those to: land/land use, community quality of life, water resources, and soils/farmland. These potential impacts require further analysis and are addressed below.

V.B.6.a Induced Growth Effects on Land and Land Use

The indirect effects analysis employed the planning judgment method described by TxDOT (2010) guidance and summarized in **Section V.B**. Interviews with Lindale area planning and economic development officials were conducted in 2008 to obtain current and forecasted land use and growth information. In February 2012, some of these individuals, along with several other local experts, were asked to reconvene in Lindale for a collaborative judgment conference to update their projections of potential induced growth and other reasonably foreseeable future development. Planning and development information was further updated in April 2013.[1]

[1] The planning/development experts included: (2012-2013) Jim Mallory, Mayor of Lindale, TX; Owen Scott, Lindale City Administrator; John Clary, President, Lindale Economic Development Corporation; Shelbie Glover, Executive Director, Lindale Chamber of Commerce; Stan Surratt, Superintendant, Lindale ISD; (2008) Charles West. City of Lindale Fire Marshall/Building Official.

Table 50 Potential Indirect Effects					
Direct Effects	**Impact-causing Activities**	**Indirect Effects[1]**	**Are Indirect Effects Inconsistent with Study Area Goals?**	**Potential Indirect Effects on Notable Features?**	**Are Indirect Effects Potentially Substantial?[2]**
Land Conversion of 423.15 acres (Alternative D) to 427.50 acres (Alternative G) of existing land uses to transportation use, depending on alternative selected	Right-of-way acquisition and construction of roadway.	(IG) As capacity/access to the study area improves, some areas would become more feasible to develop, resulting in induced land use changes; approximately 241.45 to 341.53 acres of undeveloped land within the study area could be opened for development	No	Yes	Further analysis is required to determine potential induced growth effects (see Step 6)
Community Quality of Life Relocation of 18 (Alt. D) to 10 (Alt. G) homes and 6 (Alt. D) to 2 (Alt. G) businesses, depending on alternative; removal of property from local tax rolls; temporary localized effects (detours, traffic delays) on community quality of life during construction; potential environmental justice concerns.	Right-of-way acquisition; construction mobilization; hauling of materials on public roads during construction; changes in traffic patterns due to street closures or realignments.	(E-A) Reduced travel time, more efficient movement of people and goods; improved public safety due to creation of reliever route, change in rural character of area west of Lindale; increased noise and air pollutants.	No	Yes	Further analysis is required to determine potential encroachment-alteration effects (see Step 6)
Water Resources Alternative D would affect 7 crossings of waters of the U.S., and 4 associated wetlands; Alternative G would affect 8 crossings of waters of the U.S. and 5 associated wetlands (including one seep); potential changes in hydrology, flow characteristics; increased TSS in storm water runoff (construction phase); 6.17 acres (Alternative D) to 23.64 acres (Alternative G) of floodplain crossed	Construction mobilization; channelization, filling of streams; culvert, bridge design and construction; temporary crossings; soil exposure; excavation, embankments; roadway placement	(E-A) (IG) Increased turbidity in surface streams may degrade downstream water quality and aquatic habitats; (E-A) culverts, other alterations within right-of-way may affect upstream and downstream hydrology; potential effects on floodplains from additional impervious cover associated with induced development	No	Yes	Further analysis is required to assess potential induced growth effects and encroachment-alteration effects (see Step 6)

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Table 50 Potential Indirect Effects (continued)					
Direct Effects	**Impact-causing Activities**	**Indirect Effects[1]**	**Are Indirect Effects Inconsistent with Study Area Goals?**	**Potential Indirect Effects on Notable Features?**	**Are Indirect Effects Potentially Substantial?[2]**
Vegetation Alternative D would impact 373.17 acres of vegetation, 206.85 of which are forested and Alternative G would impact 394.55 acres of vegetation, 196.63 acres of which are forested. Potential impacts to state-listed threatened and endangered species habitat	Removal of vegetation, other land cover; earthmoving; utility relocation; sloe stabilization, seeding, re-vegetation	(IG) Potential loss of pastureland, wildlife habitat due to induced development; (E-A) spread of non-native or invasive species	No	Yes	No
Wildlife Habitat loss or alteration; displacement of wildlife	Construction (vegetation/habitat removal); clearing, grading; bridge construction	(E-A) Habitat fragmentation; habitat loss for some species, creation for others (bats, swallows at new bridges); addition of permanent shade (at bridges); (E-A) (IG) potential effects on aquatic habitats from increased runoff carrying pollutants (TSS, oil and grease) and increased turbidity	No	Yes	No
Threatened and Endangered Species No T&E species or habitat for federally listed species directly affected. Some potential habitat for state-listed species impacted.	Construction (vegetation/habitat removal); clearing, grading; bridge construction	(E-A) No recorded occurrences of T&E species and no known habitat for federally listed species in the induced growth area. Some impacts to potential state-listed species habitat.	No	Yes	No
Soils/Farmland Conversion of 12.18 acres (Alternative D) to 13.18 acres (Alternative G) of prime farmland soils to transportation use; soil compaction in some areas within right-of-way	Right-of-way acquisition; earthmoving, excavation; material stockpiling	(IG) Prime farmland soils are present in the induced growth area likely converted to urban use	No	Yes	Further analysis is required to assess induced growth effects (see Step 6)

Table 50 Potential Indirect Effects (continued)					
Direct Effects	**Impact-causing Activities**	**Indirect Effects[1]**	**Are Indirect Effects Inconsistent with Study Area Goals?**	**Potential Indirect Effects on Notable Features?**	**Are Indirect Effects Potentially Substantial?[2]**
Hazardous Materials Use of potential contaminants (fuel, solvents) and generation of solid waste during construction; roadway pollutants in runoff during operation	Construction equipment operation; storage and use of fuel, other materials on or near right-of-way; disposal of cleared vegetation; demolition, removal of buildings, roadway features; construction debris removal	(E-A) Potential downstream effects of releases of contaminants during construction or operation on surface/ground water and habitats; (E-A) decreased landfill space due to disposal of construction materials; (E-A) potential exposure of asbestos containing building materials in demolished structures	No	No	No
Noise Noise impacts to 0 receptors (Alternative D) and 2 receptors (Alternative G) from roadway operation, depending on alternative; temporary construction phase noise effects.	Roadway operation; construction mobilization; equipment operation	(IG) Induced land development would result in an associated increase in noise in nearby communities.	No	No	No
Air Quality Area expected to remain in attainment under NAAQS standards; MSAT emissions for all alternatives expected to remain the same or decrease due to EPA's National Control programs; potential fugitive dust from construction activities.	Roadway operation; construction equipment operation; fuel and energy use; clearing, grading, excavation, embankment construction; reduced congestion and improved traffic flow.	(E-A) The project would not result in any meaningful changes in traffic volumes, vehicle mix, location of existing roadways, or any other factor that would cause an increase in emissions impacts relative to the No Build Alternative. Therefore, the project would not result in actions that could possibly impact air quality. As such, TxDOT has determined that this project would generate minimal indirect and cumulative impacts on air quality. Consequently, an indirect and cumulative impacts analysis for air quality was not required for this project.	No	No	No

Table 50 Potential Indirect Effects (continued)					
Direct Effects	**Impact-causing Activities**	**Indirect Effects[1]**	**Are Indirect Effects Inconsistent with Study Area Goals?**	**Potential Indirect Effects on Notable Features?**	**Are Indirect Effects Potentially Substantial?[2]**
Historic Resources No NHRP-eligible properties impacted	Right-of-way acquisition; clearing of properties	None	No	No	No
Archeological Resources 7 (Alternative D) or 6 (Alternative G) known archeological sites impacted could be impacted during construction. The remainder of the proposed alternatives have not been completely surveyed; therefore, the full extent of potential impacts to archeological resources cannot be determined at this time.	Clearing, grading, excavation activities, increased potential for looting resulting from greater access to- and population in the study area.	Potential indirect impacts to archeological sites cannot be identified at this time since the extent of direct impacts cannot be determined until survey of the alternatives is complete; however, it should be noted that indirect impacts to archeological sites would be limited to the APE.	No	No	No

[1]Categories of indirect effects:
IG = Induced growth effects
E-A = Encroachment-alteration effects

[2]Effects could be potentially significant in the absence of regulatory protections or best management practices (BMPs) to control or minimize adverse effects. Existing regulatory protections, BMPs, and other mitigating factors are addressed in Step 6.

Based on discussions with local development experts in Lindale and Hideaway and a review of the City of Lindale (2004) planning documents, some induced land development is considered reasonably foreseeable as a result of the proposed project. The proposed new location facility would provide limited access to areas not currently served by a major arterial and, as a result, would reduce the time-cost of travel and increase the attractiveness of the area to future development.

Literature reviewed for this project suggests that transportation improvements are a factor in land development decisions, but usually not the most important factor (Kockelman, et al, c. 2001). With respect to complementary development (highway-oriented businesses near interchanges, like gas stations, convenience stores, restaurants), important factors influencing the likelihood of development include: (1) distance to a major urban area where closer proximity leads to a higher probability of development; (2) traffic volumes on intersecting roads where higher volumes mean higher development potential; and (3) new access points created by the proposed roadway, which would intersect at IH 20, FM 16, and existing US 69 north of Lindale. The likelihood of future residential development that could be attributed to the proposed project is affected by a variety of factors, including (1) the presence of access roads which would provide more convenient access for future residents; (2) distance to a major urban area; (3) the availability of water and wastewater infrastructure; and (4) the quality of local school districts and other quality of life factors. The findings of this induced land use development analysis, supported by local expert opinions, are consistent with these general conclusions.

Complementary (highway-oriented) Development

Since the proposed ultimate roadway design does not include continuous access roads, access to and from the facility would be limited to the intersections of the proposed roadway with US 69, FM 16 and IH 20 and potentially at a few otherwise landlocked parcels. It is at these locations that development of complementary highway-oriented businesses is considered most likely. More extensive retail or industrial development may also occur near the new interchange with IH 20 (West, personal communication, 2008; Clary, personal communication, 2013). Commercial growth is continuing in East Texas and the Lindale area; a recent traffic study found that the intersection of IH 20 and US 69 was the second busiest intersection between Dallas and Shreveport (Glover, personal communication, 2008).

A closer review of the developable areas around the interchanges allows for an estimation of the land area potentially subject to induced growth (see **Figure 12**). The blue areas are based on appraisal district parcel boundaries and take into account the complementary development criteria cited above as well as the anticipated land use changes depicted on the Lindale Future Land Use Map (2004) (**Figure 13**). With Alternative D, an estimated 241 acres would

potentially be developed as a result of the proposed project. An estimated 341 acres would potentially be developed under Alternative G.

Induced Residential Growth

As described earlier in **Section III.B.1**, Lindale and the surrounding area grew rapidly during the period 1970-2010: 81 percent, compared with 79 percent for Smith County and 86 percent for the state. State population projections indicate this growth rate is likely to continue, increasing by 65 percent by 2030. At the 2012 collaborative judgment update meeting, panel members generally agreed that this level of population and economic growth would drive a demand for residential development, much of it expected to occur within the 13,979 acres of the AOI identified on **Figure 12**. The Future Land Use Map for the City of Lindale (2004) specifically anticipates (1) new residential development in the undeveloped areas southwest of Lindale; (2) high density residential development extending along FM 849 out to and beyond the proposed facility; and (3) neighborhood commercial development at the proposed FM 16 intersection (West, personal communication 2008).

While future residential development in these areas is considered to be reasonably foreseeable, it is more difficult to establish a proximate cause relationship between this development and the proposed Lindale Reliever Route project. The proposed project does not create new access not already provided by existing roadways (in this case, FM 16 West, FM 849, and CR 431). This makes it more difficult to quantify the extent and rate of development with any degree of certainty. Other factors would undoubtedly influence future growth. The land use experts at the 2012 update session were asked to list the priority factors most likely to influence growth. Their consensus response, in order of priority: (1) good school district (ratings higher than surrounding school districts); (2) IH 20 traffic; (3) industrial and business parks; (4) available infrastructure (utilities and roads); (5) excellent hospitals in Tyler; (6) employment opportunities in Tyler.

On the other hand, the lack of wastewater service could slow the pace of (but probably not prevent) development in the Lindale area (West, personal communication, 2008). Completion of the western segment of Loop 49 south of IH 20 is expected to influence continued development in the area; the west segment of Loop 49 was opened to toll traffic in March of 2013. The proposed project would provide an alternative access route to developable areas west and northwest of Lindale, potentially improving the time-cost of travel to future residents. The project is therefore expected to indirectly affect the amount and rate of land development in these areas.

If the proposed project is constructed, land development in the area would most likely be concentrated on the west side of the city of Lindale, in proximity to and accessible (via FM 16)

by the reliever route. The option of continuing to Tyler via the west segment of Loop 49 would be likely to make residential locations in the west Lindale area attractive to Tyler commuters, who could avoid increasing traffic congestion on US 69 both north and south of IH 20.

V.B.6.b Effects Related to Induced Growth

Social/Economic and Community Impacts (including Environmental Justice)

Following the TxDOT (2010) guidance and taking into account the findings of the Center for Transportation Research study (Kockelman, et. al., c. 2001), increased traffic on local area roadways, including existing US 69, is a potential outcome of project-related induced growth. The planning experts expect that the proposed project would divert through-traffic, particularly trucks, away from downtown Lindale, resulting in improved mobility for local traffic downtown, and potentially creating an improved situation from the standpoint of downtown business opportunities (West, personal communication 2008). New development would lead to an expansion of the local tax-base for the city, additional employment opportunities, both during construction and after, and possibly increased sales and increased property values (Carey and Semmens, 2001; Siethoff and Kockelman, 2002). The indirect economic effects of direct construction expenditures and employment (state-wide final demand) are described in **Section IV.B.1**). The possible filling in of residential development in the area between Lindale and Hideaway would represent a change in degree but not in character of the rural-suburban nature of the community.

Vegetation and Wildlife Habitat

Areas potentially altered by induced development range from grassland to forest and are generally representative of the overall project area. At the northern end of the project, induced development could impact a mix of tame pasture areas; particularly along Alternative D, and, pine forest, upland hardwood forest and mixed pine/hardwood forest. These vegetation types are not unique to the area and are already somewhat compromised in terms of wildlife habitat, due to their proximity to suburban Lindale and the existing US 69. The middle of the project area presents a potential induced development impact scenario affecting primarily tame pasture (grassland) and a small amount of mixed pine/hardwood forest along existing FM 16. These habitat pockets are already impacted by surrounding residential/industrial and transportation developments. Finally, the potential induced development areas at the south end of the project would potentially impact mostly tame pasture (grassland) to the east and mixed pine/hardwood forest to the west of its terminus with IH 20. These habitat areas are sandwiched between CR 411 to the east, Hideaway to the west, Trees USA and scattered suburban development to the north and the IH 20 corridor to the south. Existing habitat value is arguably compromised by the surrounding land uses. Vegetation planted within the proposed project right-of-way after

construction would likely be different from the original vegetation. Any fertilizer or other chemical use may impact surrounding vegetation. Any induced development would further reduce vegetation and would therefore further reduce and fragment available, albeit compromised, wildlife habitat.

Threatened and Endangered Species

According to the TPWD's TxNDD, there are no recorded occurrences of any state or federally threatened, endangered, or candidate species located within the AOI, and no habitat for federally listed species occurs within the area. Habitat types potentially impacted by induced development are described above. There is potential habitat for nine state-listed species; however, given the proximity to residential, industrial and transportation land uses, and the lack of any documented presence of the species, impacts to these species are not anticipated. The induced growth would not have indirect effects on threatened or endangered species.

Water Resources

The induced growth area includes two creeks, four tributaries, one seep, and four to five wetlands. Regulatory protections for these features include the Clean Water Act (55 U.S.C. 26) Sections 401, 402, and 404, which, if implemented, would serve to minimize any potential adverse effects. Section 402, describing the TPDES, requires the implementation of a SW3P during the construction phase of any public or private development and erosion; erosion and sedimentation controls would need to be put in place to protect the stream from storm water runoff. If future development requires additional filling or channelizing of streams, Section 404 would regulate the amount of fill that could be placed within the channel and Section 401 would prohibit the degradation of water quality. Given appropriate implementation of those regulatory controls, the indirect effects related to induced growth on water resources would be minimal.

Soils/Farmland

The vast majority of the induced growth area is rural but on the urban fringe of Lindale. The conversion of this type of land is generally the most common indirect effect related to induced growth; in this case, however, given the large amount of agricultural land in the county, these effects would not be substantial.

V.B.6.c Encroachment-Alteration

Encroachment-alteration effects as defined by TxDOT (2010) "are those that alter the behavior and functioning of the physical environment… [and] are separated from the project by time and/or distance." These effects are closely related to the impact-causing activities (Step 4) and

induced growth effects related to the proposed project (Step 6). Encroachment-alteration effects are evaluated with regard to the notable features identified within the study area (Step 3), which include: water resources; agricultural and timber production land; and the minority community west of US 69.

Potential encroachment-alteration effects to water resources within the study area would include adverse effects on water quality, aquatic species and/or their habitat as a result of storm water runoff pollution contaminating water resources within the area, which include Stevenson Branch, Davis Branch, Prairie Creek, Long Brake Creek, their associated tributaries and wetlands, and potential seeps and springs. Channelization and filling of streams and culvert construction within the right-of-way would potentially affect upstream and downstream hydrology over time (e.g., increased turbidity), which could result in further degradation of water quality and the health of aquatic species and their habitats. Potential encroachment-alteration effects to water resources within the study area would be expected to be greater for Alternative G than Alternative D, since Alternative G would impact a larger area of water resources (7.38 acres) than Alternative D (3.73 acres). Nevertheless, since potential effects to water resources would be minimized through protection requirements by various federal and state regulatory programs, including the Clean Water Act, the encroachment-alteration effects for both alternatives are considered insubstantial.

Potential encroachment-alteration effects to agricultural and timber production land within the study area would be closely related to the induced growth effects associated with the proposed project. With improved access throughout the study area, development of existing agricultural and timber production land would likely occur. Removal of 166.32 acres (Alternative D) and 197.92 acres (Alternative G) of land would lessen the amount of available agricultural land within the study area and result in reduced availability of timber, an agricultural commodity. For those dependent on agriculture and timber as a source of income, this could potentially lead to reduced income. By comparison, the impacted agricultural and timber production land within the study area represents only a small portion of the resource within the county; therefore, potential encroachment-alteration effects of the proposed project on this resource are not considered substantial.

The minority community west of US 69 near the northern terminus of the project area would potentially undergo encroachment-alteration effects as result of the proposed project. With six residential relocations within a census block with a greater than 50 percent minority population, Alternative D would be more likely than Alternative G (which would result in zero relocations in minority blocks) to result in loss of community cohesion or stability due to neighborhood fragmentation. Alternative D would also experience a higher degree of permanent changes in travel patterns than Alternative G as a result of the realignment of CR 4148, the partial closure of CR 4116, and the extension of CR 4117 at US 69. Modifications to these county roads could

result in minor impacts to local travel patterns. The closure or realignment of these roads would not result in a loss of access to area residents. While these changes could affect the minority community in this area, the effects would not be considered to be disproportionately high and adverse, as discussed in **Section IV.B.3.**

Alternative D would be located closer to nearby residential land uses than Alternative G, resulting in greater impacts to the aesthetic environment as well as to a potentially increased perception of air quality and noise impacts. Potential encroachment-alteration effects of Alternative D would therefore be considered more substantial than those related to Alternative G.

V.B.6.d Evaluate Results

The analysis in the first part of Step 6 supports the conclusion that the indirect effects of the proposed project are not substantial, especially considering the regulatory protections in place. The purpose of evaluating the analysis results is to examine the potential for uncertainty in the assumptions made thus far and whether that uncertainty could lead to substantial changes in the range of severity of the potential indirect effects (TxDOT, 2010). It has been noted that the variation in uncertainty between highway-oriented development at interchanges versus future residential growth in the AOI led to a decision to attempt to quantify the former but not the latter.

While uncertainty is inherent with regard to the specificity in the opinions and predictions of induced growth made by the local planning experts, the information provided by the planners represents their best professional judgment and is based on their intimate knowledge of their cities and planning areas. In addition to the judgment of Lindale area planners, assumptions were made using aerial photograph interpretation and SCAD parcel data regarding land available for development in the project vicinity. While these types of interpretations represent best judgment on the part of experienced industry professionals, they are nonetheless subject to error. In light of these uncertainties, it is reasonable to conclude that the majority of land subject to induced development is fairly homogeneous rural land in the vicinity of the project termini at US 69 and IH 20 and at its midpoint at FM 16 where access is provided.

V.B.7. Step 7: Assess Consequences and Consider/Develop Mitigation (When Appropriate)

The purpose of this step is to assess the consequences of the potential indirect effects and develop strategies to address unacceptable outcomes. Mitigation opportunities are addressed for the resources identified in **Table 50** as having potentially substantial indirect effects. These include land, community quality of life, water resources and soils/farmland. Because previous steps have determined that the indirect effects of the project are not substantial, additional mitigation for indirect effects beyond that required by the various regulatory programs is not

proposed[2]. Note also that not all resource protection regulations apply to private land development activities.

State and local regulations are in place to minimize indirect and cumulative effects, particularly for water quality. Impacts to water quality from private construction projects would be subject to compliance with storm water and pollutant discharge requirements of Sections 401 and 404 of the Clean Water Act, as well as erosion and sedimentation control measures under TPDES. Private construction sites of five acres or more are subject to TCEQ construction general permit requirements for TPDES, which require preparation and implementation of a SW3P (see **Section IV.M.2.c.**).

Any land development projects within the city of Lindale would be subject to zoning codes and development regulations. Private construction activities are also subject to the Migratory Bird Treaty Act (MBTA), which is intended to protect most bird species from direct taking and restricts land clearing and vegetation removal that would interfere with nesting or breeding activities. State and federal enforcement of the MBTA and other wildlife and habitat protection measures is not uniform throughout all areas of the state.

Continued residential land development within the AOI would potentially reduce the amount of available land for agricultural production. The NRCS Farmland Conversion Impact Rating found that the agricultural effects of the proposed Loop 49 Lindale Reliever project did not meet the criteria for protection or coordination under the FPPA (**Section IV.A.4.b**). Agricultural uses in the AOI are mostly grazing, hay production, with some acreage dedicated to timber and nursery production, especially roses. Some of the existing agricultural land uses in the Lindale urban fringe may be expected to give way to residential and commercial development over the 25 year indirect effects time frame. Higher value timber and nursery production lands are more likely to persist amid the gradual spread of suburban land uses in the AOI west Lindale.

Indirect effects on prehistoric and historic cultural resources are geographically limited to the Area of Potential Effect (APE) established under the PA-TU and MOU between TxDOT and the THC (see **Section III.H.1**). Private development activities within the AOI beyond the APE would not be subject to cultural resources regulatory protection, and potentially important

[2] Federal Highway Administration policy states that if adverse impacts are predicted to occur, measures necessary to mitigate adverse impacts will be incorporated into the action and are eligible for Federal funding when the Administration determines that (1) The impacts actually result from the Administration action; and (2) The proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures. FHWA is the final decision maker. Other federal agencies with jurisdiction by law may require mitigation that FHWA includes in the federal action (FHWA, 2011.)

undiscovered cultural resource sites could be adversely affected. Due to uncertainties about the magnitude of these effects and their causal relationship to the proposed project, these potential indirect effects are considered possible but not probable, and are not further addressed.

V.C Summary of Indirect Effects

V.C.1. No Build Alternative

The No Build Alternative would not result in any indirect effects and is not consistent with local plans.

V.C.2. Build Alternatives

The Lindale Reliever Route project does not have an explicit development purpose, does not conflict with local plans, and is not planned to serve specific land development. Because induced land development would be likely, particularly at intersections, and because the proposed project is likely to influence the location of new land development, a detailed analysis of induced growth was performed for the proposed project. In addition, because one notable feature, a minority population, would be impacted by Alternative D, an analysis of encroachment-alteration effects was performed. The planning judgment approach was utilized for the analysis of indirect effects, and local planners and officials were interviewed. These interviews yielded information regarding local trends in development, development plans, and constraints to development.

Induced growth is anticipated because the proposed project would create access to intersection areas not currently traversed by a higher capacity roadway. Land development having complementary functions, such as gas stations, is likely to occur at the intersections with IH 20, FM 16, and US 69; other roads crossed by the reliever route would not be accessible by continuous access roads. These highway-oriented developments are estimated to require conversion of between 241 acres (Alternative D) and 341 acres (Alternative G) of currently undeveloped land. Intraregional land development location decisions would also likely be influenced because land in the area could become more attractive for residential development as a result of new access and increased mobility. Due to the uncertainty of assumptions required to predict future development decisions, the amount of future induced residential development could not be quantified. However, it is reasonable to anticipate that the proposed project could moderately influence the rate of development in the 13,979-acre AOI.

The analyses of induced growth and encroachment-alteration effects concluded that notable features within the project area would not suffer substantial adverse indirect effects. While some

induced growth is anticipated, the indirect effects of development are not expected to be substantial.

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VI. Cumulative Effects

VI.A. Regulatory Background

In accordance with TxDOT's September 2010 guidance, the analysis of cumulative effects addresses the following: (1) identify the resources to consider in the analysis; (2) define the study area for each resource; (3) describe the current status/viability and historical context for each resource; (4) identify direct and indirect impacts that might contribute to a cumulative impact; (5) identify other reasonably foreseeable future effects; (6) identify and assess cumulative impacts; (7) report the results; and (8) assess the need for mitigation.

This section addresses the determination of resources assessed for cumulative effects and then follows the eight-step process described above for cumulative effects. Because the need and purpose, the design, and the alignment (except for the northern portion) of Alternatives D and G are very similar, the potential cumulative effects of the two alternatives are virtually the same. There are a few exceptions, however, which are discussed in detail where appropriate.

VI.B. Identify the Resources to Consider in the Analysis (Step 1)

According to TxDOT guidance (2010), if a project would not cause direct or indirect impacts on a resource, it would not contribute to a cumulative impact on that resource. This analysis focuses on resources that are affected by the technically preferred alternative or are considered to be at risk of declining. Direct and indirect effects are described by resource category below in **Table 51**.

Table 51 Identification of Resources to Consider in the Cumulative Effects Analysis

Resource	Summary of Direct Effects	Indirect Effects	Topic to be Included in Cumulative Effects Analysis	Reason Eliminated from Cumulative Effects Analysis
Land	Conversion of 423.15 acres (Alt. D) to 427.50 acres (Alt G) of existing land uses to transportation use, depending on the alternative selected	As capacity/access to the study area improves, some areas would become more feasible to develop, resulting in induced land use changes; approximately 241.45 acres (Alt. D) or 341.53 acres (Alt. G) of undeveloped land within the study area could be made more attractive for residential development	Yes	Not Applicable

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Table 51 Identification of Resources to Consider in the Cumulative Effects Analysis (continued)				
Resource	**Summary of Direct Effects**	**Indirect Effects**	**Topic to be Included in Cumulative Effects Analysis**	**Reason Eliminated from Cumulative Effects Analysis**
Community Quality of Life	Relocation of 18 (Alt. D) or 10 (Alt. G) homes and 6 (Alt. D) or 2 (Alt. G) businesses, depending on the alternative; 2 (Alt. D) or 0 (Alt G) noise receivers impacted; removal of property from local tax rolls; temporary localized effects (detours, traffic delays) during construction; reduced travel time, more efficient movement of people and goods; improved public safety due to creation of reliever route	Some potential for induced development; some increased traffic noise and air pollutants in induced development areas. Positive effects to air quality based upon reduced congestion and improved traffic flow; EPA's vehicle and fuel regulations, coupled with fleet turnover, would over time cause substantial reductions of on road emissions, MSATs, and the ozone precursors VOC and NOx	No	The project would increase safety and mobility; most impacts are considered beneficial
Water Resources, Including Waters of the U.S. and Wetlands	7 (Alt. D) or 8 (Alt. G) crossing of waters of the U.S., one seep (Alt. G) and 4 (Alt. D) or 5 (Alt. G) wetlands affected; potential changes in hydrology, flow characteristics; increased TSS in storm water runoff (construction phase); 6.17 acres (Alt. D) or 23.64 acres (Alt. G)of floodplain crossed	Increased turbidity in surface streams may degrade downstream water quality and aquatic habitats; culverts, other alterations within right-of-way may affect upstream and downstream hydrology; potential effects on floodplains from additional impervious cover associated with induced development	Yes	Not Applicable
Vegetation and Wildlife	373.17 acres (Alt. D) or 394.55 acres (Alt G) of vegetation removed, including 196.63 acres (Alt. D) or 206.82 acres (Alt. G) of forest vegetation	Potential loss of forests, wildlife habitat due to induced development; spread of non-native or invasive species	Yes	Not Applicable
Historic Resources	No NHRP-eligible properties impacted	If there are no direct effects, indirect effects are not applicable.	No	If there are no direct or indirect effects, cumulative effects are not applicable.

Table 51 Identification of Resources to Consider in the Cumulative Effects Analysis (continued)				
Resource	**Summary of Direct Effects**	**Indirect Effects**	**Topic to be Included in Cumulative Effects Analysis**	**Reason Eliminated from Cumulative Effects Analysis**
Archeological Resources	7 (Alt. D) or 6 (Alt. G) known archeological sites could be impacted during construction. Portions of Alts. D and G have not been surveyed due to lack of right-of-entry.	Potential indirect impacts to archeological sites would be limited to the project right-of-way (the APE established by the Programmatic Agreement [PA-TU]). Archeological sites within the proposed right-of-way (the APE) are subject to protection or mitigation under Section 106 of the NHPA.	Yes	Not Applicable

VI.C. Define the Study Area for Each Resource (Step 2)

The identification of Resource Study Areas (RSA) was based on resource-specific characteristics and natural or political boundaries. The RSAs were reviewed from both temporal and geographic perspectives. The timeframe in which effects to resources were considered for this analysis is 1999 to 2035. This timeframe represents the span of time from the beginning of the planning process for the Lindale Reliever Route project to the projected date to which most planning considerations currently extend. This timeframe was also selected due to the fact that growth in the Lindale area increased markedly at this time due to newly opened private sector job opportunities (e.g., Target Distribution Center), and this growth pattern is representative of the condition of the area today. **Table 52** lists the geographic area reviewed for the RSA for each resource.

Table 52 Resource Study Area (RSA) for Each Resource Considered in the Cumulative Effects Analysis & Selection Rationale	
Resource	Resource Study Area – Selection Rationale
Land	Smith County – primary planning jurisdiction in area outside Lindale municipal boundary
Water Resources, Including Waters of the U.S. and Wetlands	Sabine and Neches River basins; Stream segments 0506, 0606, and 0606A; floodplains associated with Stevenson Branch and Davis Branch – primary data gathering study area for assessment of water quality by the Texas Commission on Environmental Quality
Vegetation and Wildlife	Ecotone between the Pineywoods and Post Oak Savannah Ecoregions of Texas – most representative ecological region for the study area
Archeological Resources	Area of anticipated development (the same as the AOI for the proposed project) – most likely area for impact of cumulative effects

VI.D. Describe the Current Status/Viability and Historical Context for Each Resource (Step 3)

VI.D.1 Land

According to the NRCS, land use in Smith County is primarily forestland and pastureland. Although communities such as Tyler and Lindale have been experiencing growth recently, approximately 85 percent of the County is undeveloped. The county comprises 932 square miles (40,597,920 acres) of the East Texas Timberlands region. Two-thirds of this environment is covered in post oak, blackjack oak, and tall grasses, and one-third is heavily forested with pine and hardwoods. Only 1 to 10 percent of the county is prime farm land. Between 1990 and 2000, Smith County's population grew 15.5 percent from 151,309 to 174,706. The population for 2010 was estimated to be 194,223, according to the Texas Water Development Board (TWDB), an increase of 11.7 percent over ten years. By 2040, the population is projected to grow to 223,251. In recent decades, hay, roses, and fruit were among the main agricultural products in the County (McCrosky, 2013b).

VI.D.2 Water Resources, Including Waters of the U.S. and Wetlands

The project area is located in the Sabine and Neches River basins. Surface water from the project area runs to stream segments 0506, 0606, and 0606A. According to the 2013 Section 303(d) list, segments 0606 and 0606A are classified as impaired. The project area includes streams and wetlands but does not cross any navigable waters; coordination is not required with the U.S. Coast Guard under Section 9 (General Bridge Act of 1946, 33 U.S.C. §525 et seq) or U.S. Army Corps of Engineers under Section 10 (Rivers and Harbors Act of 1899, 33 U.S.C. §§401-413). In addition, there are several wetland areas mapped by the NWI that occur within the cumulative effects study area; however, those mapped wetlands occurring outside of the project area have not been field verified. The health of this resource in the RSA is considered stable (slight decline), assuming compliance with existing Clean Water Act regulations.

VI.D.3 Vegetation and Wildlife

The project area occurs on the border between the Pineywoods and Post Oak Savannah Ecoregions of Texas. The mapped vegetation types in the area are Other Native or Introduced Grasses and Post Oak Woods, Forest and Grassland Mosaic. The project area contains grasslands and forests. The health of the vegetation/wildlife habitat resource in the project area is considered stable, recognizing the slight decline of habitat as development occurs in the Vegetation and Wildlife RSA.

VI.D.4 Archeological Resources

Excluding the sites investigated and recorded directly within the proposed undertaking, there are five additional previously recorded archeological sites (41SM202, 41SM396, 41SM50, 41SM163 and 41SM347) within the RSA, none of which are listed in the NRHP. Of the full RSA, only a small section of the northern periphery along US 69 has been archeologically surveyed. The remainder of the RSA has not been fully assessed for potential archeological sites. However, based upon a brief examination of prevailing topography, soils, development, and site distribution in the region, approximately 60-70 percent of the RSA can be considered moderate to high probability for containing archeological sites, particularly in areas that are on terraces and uplands overlooking waterways. Any number of sites could be located within these higher probability areas, and it is impossible to determine the significance of those sites. Development projects on public lands or any development requiring federal permits are required by the NHPA and/or the ACT to take into account the effects of the construction on archeological historic properties or to apply for a permit prior to construction to impact those resources. Privately funded development projects that emerge as a result of the current proposed project could potentially affect an unknown number of unrecorded archeological sites within the RSA. Identification, evaluation, and resolution of any adverse effects to such sites under the control of TxDOT would proceed in accordance with the first amended Programmatic Agreement among FHWA, TXDOT, SHPO, and ACHP regarding the implementation of transportation undertakings, as well as the Memorandum of Understanding between TxDOT and the THC. With so little of the Archeological RSA investigated, there is a very high likelihood that additional sites would be affected by development; however, without survey, there is no way, at this time, to quantify the number or significance of those impacts from private development for the purposes of this volume.

VI.E. Identify Direct and Indirect Impacts of the Project that Might Contribute to a Cumulative Impact (Step 4)

Direct impacts were discussed in previous sections. Direct and indirect impacts that may contribute to cumulative impacts are summarized by resource in **Tables 49** and **50**.

VI.F. Identify Other Reasonably Foreseeable Future Effects (Step 5)

VI.F.1. Regional Economic Development Trends

There has been and continues to be residential, commercial and retail growth in the vicinity of the proposed project. On US 69 south of FM 16 in Lindale, Lowe's, Wal-Mart, and various restaurants, hotels and shopping centers were built in the 2000-2010 decade. This area has been the main growth corridor in Lindale. An office park and an industrial park are both planned for

southwest Lindale (West, personal communication, 2008). Commercial development is continuing at the IH 20 and US 69 interchange. The residential development trend in Lindale of moving southwest is expected to continue as the wastewater service is extended.

Several specific commercial and infrastructural developments are expected to occur as part of the continuing economic growth of Lindale and environs (Clary, personal communication, April 2013):

- Announced in 2012, a major 165,000 sq ft FedEx Ground distribution facility is under construction at industrial park south of IH 20. Completion is expected in the summer of 2014.
- Tyler Junior College Lindale campus. Negotiations have been underway, but a site is not yet identified.
- Lindale Business Park and Lindale Industrial Park (includes water rights bought to service these areas); a 25,000 sq ft commercial facility is under development (Spring 2013).
- Sewer line extension between US 69 and Harvey Road south of existing school.
- Over longer term, the City is expected to build another WWTP south of IH 20 in a few years.
- Water tower and water well planned to improve water supply city wide.
- Elementary School campus will be needed within next 10 years.
- Continued build out of existing residential subdivisions.
- Continued new residential development, especially to southwest of Lindale.
- There are current plans for 92 unit apartment complex at US 69 and IH 20, SE quadrant.
- A developer has acquired 1000 acres near southeast quadrant of IH 20 and US 69 and plans to build 1200 homes in the future. Intense development at this location could create traffic problems at outdated interchange, with replacement of two-way access roads a priority.
- Continued development along FM 16.

VI.F.2. Transportation Development

VI.F.2.a Transportation Goals and Trends

Transportation has always played a key role in the development of communities in this region. Lindale was originally established along a rail line. US 69 and IH 20 continue to have an impact on the community. US 69/Main Street "forms the backbone of the community's street system," according to the Lindale Comprehensive Plan (City of Lindale, 2004).

The City of Lindale's transportation goals, as stated within the plan, include:

- Link land use and transportation,

- Maintain and enhance the existing transportation circulation network,
- Improve access controls and minimize vehicular conflicts on the major street system,
- Provide a multi-modal system, including walking, bicycling, and mass transit,
- Reduce congestion,
- Finance needed improvements to maintain a balanced multi-modal transportation system, and
- Re-establish US 69 as Lindale's "Main Street" and avoid the need to widen US 69 to six travel lanes in the future.

VI.F.2.b Reasonably Foreseeable Future Transportation Projects

Reasonably foreseeable projects in the vicinity of the Lindale Reliever Route which are either listed in the 2013–2016 Statewide Transportation Improvement Plan (STIP), part of the Lindale Comprehensive Plan, or partially underway include:

- Widening of FM 849 from FM 16 to SH 110.
- Widening of FM 16 from SH 110 to SH 155.
- Toll 49 North – The northern segment (the proposed Lindale Reliever Route discussed in this DEIS), would connect to Toll 49 West at IH 20, continuing north and tying into US 69 north of Lindale. Construction is anticipated to proceed in phases. The project would be funded with toll revenue bonds. The North East Texas Regional Mobility Authority has committed to issue these bonds and construct the Lindale Reliever Route as the next expansion of the toll system.
- Extension of the East/West Connector Boulevard westward to FM 849.
- Toll 49 East – The eastern segment of Loop 49 (East Texas Hourglass) will connect to Toll 49 South at SH 110 and extend north to IH 20 in the vicinity of SH 155. The eastern segment is not currently under development.

Tyler's regional transportation system has been advanced with the recent (Spring 2013) completion of major elements of the Toll 49 project:

- Toll 49 South – Segment 1 from State Highway (SH) 155 east to US 69 was completed and opened to traffic as a toll road in November 2006. Segment 1 was the first total Electronic Toll Collection (ETC) road in Texas. Segment 2 from US 69 to FM 756 (Paluxy Road) was completed and opened to toll traffic in March 2008. The Toll 49 South segments total about 7.0 miles.
- Toll 49 West – Segment 3A from SH 155 to SH 31 was completed and opened to toll traffic in November 2012. Segment 3B was completed using the Design-Build project delivery concept. Extending north from SH 31 to IH 20, the project was completed and opened to toll traffic in March 2013. The Toll 49 West segments total about 16.8 miles.

VI.F.2.c Regional Considerations Related to Toll Roads and Environmental Justice Populations

A regional toll analysis (RTA) will be completed by TxDOT and the Tyler Area MPO and included in the Final EIS to evaluate potential tolling effects on low income and minority communities.

The Tyler Area MPO planning region includes the city of Tyler and other urbanized areas considered likely to experience urban growth during the 25-year planning horizon, including Gresham, Lindale, Hideaway, New Chapel Hill, Noonday, and Whitehouse (Tyler Area MPO, 2010). There are two tolled or managed roadways currently operational or under construction in the region, Loop 49 South and Loop 49 West. The currently proposed Loop 49 North Lindale Reliever Route would constitute a third segment to the tolled Loop 49 system. These projects are described in **Section VI.F.2**.

The Tyler Area MTP 2035 (Tyler Area MPO, 2010) does not include a network level EJ analysis for toll roads. However, as the agency responsible for coordinating the regional transportation planning process, the Tyler Area MPO has sought to make sure that all segments of the population have been involved with the planning process, including the MTP, the transportation improvement program, and specific project planning. To this end, the MTP provides that the MPO will:

- Identify minority and low-income populations;
- Ensure public outreach effort reaches out to minority and other under-represented groups; and
- Overlay environmental justice maps with the recommended long range transportation improvements to broadly assess potential adverse impacts or disproportionate allocation of long range transportation investments towards minority and/ or low-income populations.

The MTP identifies EJ populations by Census block groups within the urbanized planning region. Figure 5-4 of the MTP shows the distribution of these areas around Tyler. Further information about the relationship between transportation planning and the occurrence of EJ populations is excerpted below from the MTP.

Minority Census Block Groups

An EJ area is defined as a census block group (CBG) that has high concentration of minority and/or low-income populations when compared to the overall planning area. The minority population of individual CBGs in the Smith County ranges from 0.9 percent to 97.5 percent. Minority EJ CBGs are determined by the minority (non-white) percentage of the population

in a CBG. Any CBG with a minority population percentage equal to or greater than 50 percent is considered a minority EJ area. Of the planning area's 125 CBGs, 28 have a minority population equal to or greater than 50 percent. These CBGs are selected for EJ analysis. CBGs having high minority population are in Tyler and are generally inside Loop 323. One census block group located east of Loop 323 along TX 31 and partly within the metropolitan planning area has a nearly 60 percent minority population.

Low-Income Census Block Groups

The Department of Housing and Urban Development's (HUD) definition of low-income in Title 24 CFR 5.603(b) is adopted to determine which census blocks in the county have high concentrations of low-income households. HUD defines low-income as "a family whose annual income does not exceed 80 percent of the median income for the area." The distribution of median household incomes (in 1999 dollars) across all census block groups in Smith County is about $34,700. The criteria for determining a low-income census block group is determined as those CBG with household median income of 80 percent of $34,700 or $27,760 and below. Of the planning area's 124 CBGs, 26 CBGs have median incomes less than $27,760 and therefore qualify as low-income EJ areas. Census block groups having high low-income population are generally located in Tyler inside Loop 323 (Tyler Area MPO, 2010).

From a regional perspective, the block groups having high (greater than 50 percent) minority populations are generally located in Tyler inside Loop 323. Low-income population areas similarly tend to be concentrated within Loop 323. Note that the MPO uses the HUD definition of low-income, which is "a family, whose annual income does not exceed 80 percent of the median income for the area," which is Smith County. This sets the low-income threshold at $37,292, which is higher than the DHHS guideline set by FHWA for EJ analysis. In most other respects, the tolling policies and procedures of the MPO and the TxDOT Tyler District are consistent.

With respect to the agency's policy and practices for addressing the service needs of EJ populations, the MTP states that

> [t]he Tyler Area MPO is committed to avoiding disproportionately adverse impacts on minority and low-income populations, as well as disproportionate adverse impacts on the elderly, persons with disabilities, and those without private automobiles for inclusion in public involvement efforts and for transportation needs assessments. Tyler Area MPO uses several techniques to ensure underserved populations are involved in the transportation planning process. Techniques include staff presentations to community groups, providing public notices, and advertising in newspapers that serve minority

populations. The MTP update will consider environmental justice impact by superimposing EJ maps with the recommended long range transportation improvements (Tyler Area MPO 2010).

VI.G. Identify and Assess Cumulative Impacts (Step 6)

The proposed project, in combination with the other past, present and reasonably foreseeable future actions discussed above, would cumulatively affect the health of the following resources: land, water resources, vegetation/wildlife and archeological sites. Because acreages were not available for all of the reasonably foreseeable actions, a quantification of cumulative impacts was not possible. **Table 51** provides a matrix for understanding the cumulative effects on the resources within their respective RSAs.

VI.G.1 Land Resources

Potential cumulative effects to land resources include increased urbanization and reduction in undeveloped or agricultural land. Conversion of existing land for transportation uses (between 423.15 acres for Alternative D and 427.50 acres for Alternative G, depending on the alternative selected) would directly affect the proposed project area. Regional development and transportation improvements would both be contributing factors to loss of this land, and increased access following construction of the proposed project would make currently undeveloped land more attractive for residential development. In terms of indirect impacts to land resources, with Alternative D, an estimated 241 acres of potential complementary development would occur as a result of the proposed project. An estimated 341 acres of complementary development would potentially occur under Alternative G. Despite loss of undeveloped or agricultural land as a cumulative effect associated with the proposed project, Smith County overall would remain largely undeveloped.

VI.G.2 Water Resources, Including Waters of the U.S. and Wetlands

Depending on the alternative selected, ten crossings of waters of the U.S., one seep, and four to five wetlands could be affected, leading to potential changes in hydrology and flow characteristics, increased TSS in storm water runoff during the construction phase, and 6.17 acres (Alternative D) to 23.64 acres (Alternative G) of floodplain crossed. Indirect effects would include increased turbidity in surface streams, potential effects on floodplains from increased impervious cover (associated with induced development), and other alterations within the right-of-way that may affect upstream and downstream hydrology. Additional avoidance and minimization of direct wetlands impacts will be an objective of the detailed design phase of the proposed project, and the USACE Section 404 permit process would be expected to achieve compensatory mitigation for unavoidable impacts at a minimum 1:1 ratio. Regional

development could lead to a decline in water quality, and additional transportation improvements in the Lindale area could increase storm water runoff and pollutants entering waterways. With effective compliance with state and federal water quality requirements, including full implementation of temporary and permanent stormwater and erosion control BMPs, the proposed project would not contribute substantially to impacts on water resources within the proposed project area.

VI.G.3 Vegetation and Wildlife

Potential direct effects to vegetation and wildlife within the proposed project area include loss of vegetation (373.17 acres for Alternative D to 394.55 acres for Alternative G depending on the alternative selected). Forest losses would range from 196.63 acres for Alternative D to 206.82 acres for Alternative G. This loss could lead to impacts to state-listed threatened and endangered species habitat. Indirect loss of habitat due to induced development would likely occur, along with the spread of non-native invasive species. Regional development and transportation improvements would also likely result in vegetation and wildlife habitat loss. Assuming regulatory compliance and compensatory mitigation, a slight decline in vegetation and wildlife resources within the project would occur.

VI.G.4 Archeological Resources

The proposed project would directly impact seven (Alternative D) or six (Alternative G) previously recorded archeological sites, and increased mobility could encourage development not associated with the proposed project within areas that have not been surveyed for archeological resources. Furthermore, it is likely that impacts would occur to both previously recorded and undocumented archeological sites as a result of projected population growth and related future development in the area.

VI.H. Report the Results (Step 7)

This step of the cumulative impacts analysis summarizes the approach and findings of Steps 1-6 of the analysis.

Step 1: Determination of Resources Included in the Cumulative Effects Analysis
This step of the analysis identifies resources that are affected by the preferred alternative or are considered to be at risk or declining. In order to contribute to a cumulative effect, the project must cause a direct or indirect impact on the resource. The following resources were identified for further analysis concerning cumulative effects:

- Land Resources
- Water Resources, Including Waters of the U.S. and Wetlands

- Vegetation and Wildlife
- Archeological Resources

Step 2: Definition of Study Area for Each Resource Considered in Cumulative Effects Analysis
The RSA for each resource was determined by assessing the potential direct and indirect effects resulting from changes in land use as a result of the proposed project and other known projects that may contribute to cumulative effects. The RSA for each resource are described in more detail in **Table 52** in **Section VI.I**.

Step 3: Current Health and Historical Context of Resources
The purpose of this step is to identify the current health, sustainability, and historical context of the resources considered for cumulative analysis. The status of the various resources considered in the cumulative effects analysis are discussed in greater detail in Section VI.D, and are briefly summarized below.

Land Resources: As stated in **Section VI.D.1**, the forest land and pastureland of Smith County is approximately 85 percent undeveloped. Recent decades have seen a relatively steady increase in population in Smith County with a projected population of 237,766 persons in 2040, an increase of 22.4 percent over the next 30 years.

Water Resources, Including Waters of the U.S. and Wetlands: Surface water from the project area runs to stream segments 0506, 0606, and 0606A, with segments 0606 and 0606A listed as impaired. The project area does not cross any navigable waters, though four to five wetland areas are mapped within the cumulative effects study area. The health of water resources, including waters of the U.S. and wetlands, is considered stable (slight decline), assuming compliance with existing CWA regulations. See **Section VI.D.2** for more detailed information regarding the health of this resource.

Vegetation and Wildlife: The health of the vegetation and wildlife resources within the RSA is considered stable, with slight decline of habitat as development occurs in the cumulative effects study area. **Section VI.D.3** describes the vegetation and wildlife resource status more thoroughly.

Archeological Resources: Five previously recorded archeological sites (beyond those previously identified as being located within the alignments of Alternatives D and G) are located within the RSA, though none of these are listed on the NRHP. As indicated in **Section VI.D.4**, the RSA has not been fully investigated, leaving a very high likelihood that undocumented archeological sites could be affected by development. Approximately 60-70 percent of the RSA can be considered moderate to high probability for containing archeological sites however, there is no way to quantify these impacts without conducting survey. Private development projects can

occur without regulatory oversight, subjecting potential cultural resources to adverse impacts. Nonetheless, disclosure of potential environmental impacts due to reasonably foreseeable development activities by other parties can be beneficial by informing developers or other governmental or non-governmental entities of opportunities for preservation.

Step 4: Identification of Direct and Indirect Impacts that may Contribute to Cumulative Impacts
The direct impacts of the proposed project alternatives are summarized using information from **Chapter IV, Environmental Consequences**. The indirect impacts are identified in **Chapter V, Indirect Effects**. The direct and indirect (as well as cumulative) effects are also described in **Table 53** in **Section VI.I**.

Step 5: Other Past, Present, and Reasonably Foreseeable Future Actions
The past, present, and reasonably foreseeable future actions are described in detail in **Section VI.F**. These actions are discussed in terms of regional development trends and transportation improvements within the proposed project area. In addition to continued residential, commercial, and retail growth within the area, the Lindale Comprehensive Plan outlines transportation goals to be met through actions including completion of the Toll 49 and other projects.

Step 6: Potential Cumulative Effects
Cumulative effects are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" (40 CFR 1508.7). As shown in **Table 53**, the direct and indirect effects of the proposed project would contribute to the cumulative effects on the health of land and water resources within the RSAs identified for the analysis.

VI.I. Assess the Need for Mitigation (Step 8)

This section discusses the existing regulations that currently exist to protect the resources examined with regard to cumulative effects. As pointed out in the Indirect Effects chapter, **Section V.B.7**, it was determined that the indirect effects of the project are not anticipated to be substantial, and therefore additional mitigation for indirect effects beyond that required by the various regulatory programs is not proposed. Note also that not all resource protection regulations apply to private land development activities. Nonetheless, disclosure of potential environmental impacts due to reasonably foreseeable development activities by other parties can be beneficial. The U.S. Supreme Court stated, in Robertson v. Methow Valley Citizens Council, 490 U.S. 332 (1989)

> "…where the adverse effects… are primarily attributable to predicted off-site development that will be subject to regulation by other governmental bodies, the EIS

> serves the function of offering those bodies adequate notice of the expected consequences and the opportunity to plan and implement corrective measures in a timely manner."

State and local regulations are in place to minimize indirect and cumulative effects, particularly for water quality. These mitigation and resource protection programs are discussed in **Section V.B.7**; similar measures are applicable to the cumulative effects on resources and are discussed in the following subsections.

VI.I.1. Land Use

Proposed development in portions of the project area falling within the city boundary of Lindale would be subject to planning and zoning processes and areas within Lindale's ETJ would be subject to subdivision planning and platting processes. Any relocation caused by federally funded projects would be required to comply with the Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended.

VI.I.2. Water Resources, Including Waters of the U.S. and Wetlands

With regard to water quality, under Section 401 of the Clean Water Act, the TCEQ is authorized to certify that federally issued permits will meet the state's water quality standards. The TCEQ regulates this section under the USACE permit programs and requires the installation of temporary and permanent storm water BMPs. Under Section 404 of the Clean Water Act, the USACE regulates impacts to jurisdictional waters and wetlands through implementation of their permitting process. Projects that disturb more than one acre are required to comply with the TPDES permit requirements.

Trends in the regulation of waters of the U.S., including wetlands, are focusing on compensatory mitigation requirements. Regulatory agencies are expected to develop procedures to track the success and completion of mitigation efforts as the focus moves toward replacement of specific aquatic functions, rather than replacement of total area. Compensatory mitigation for impacts to project area wetlands would most likely occur at the Anderson Tract, located in northern Smith County. The Anderson Tract is a 4,937 acre tract of bottomland hardwoods that was acquired by the Parks and Wildlife Foundation of Texas. They established a wetland mitigation project to offset TxDOT impacts to waters of the U.S. and associated wetlands lost to future highway construction projects in northeast Texas (Cox, 1995). The wetland mitigation plan will be coordinated with the USACE as part of any required Section 404 permits.

Table 53 Summary of Potential Cumulative Effects						
Resource	**Proposed Alternative**		**Other Actions (Direct and Indirect Effects)**		**Potential Cumulative Effects**	**Health of the Resource**
	Direct Effects	**Indirect Effects**	**Regional Development**	**Transportation**		
Land Use/Value	Conversion of 423.15 acres (Alternative D) to 427.50 acres (Alternative G) of existing land uses to transportation use, depending on the alternative selected	As capacity/access to the study area improves, some areas would become more feasible to develop, resulting in induced land use changes; approximately 241.45 acres (Alternative D) to 341.53 acres (Alternative G) of undeveloped land within the study area could be made more attractive for residential development	The conversion of undeveloped land to residential and commercial uses	The conversion of undeveloped land to transportation uses	Increased urbanization and loss of agricultural/undeveloped land	Smith County would still be primarily rural and undeveloped; growth in accordance with land use regulations within the city of Lindale and its ETJ

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Table 53 Summary of Potential Cumulative Effects (continued)						
Resource	**Proposed Alternative**		**Other Actions (Direct and Indirect Effects)**		**Potential Cumulative Effects**	**Health of the Resource**
	Direct Effects	**Indirect Effects**	**Regional Development**	**Transportation**		
Water Resources, Including Waters of the U.S. and Wetlands	Alternative D would affect 7 crossings of waters of the U.S., and 4 associated wetlands; Alternative G would affect 8 crossings of waters of the U.S. and 5 associated wetlands (including one seep); potential changes in hydrology, flow characteristics; increased TSS in storm water runoff (construction phase); 6.17 acres (Alternative D) to 23.64 acres (Alternative G) of floodplain crossed	Increased turbidity in surface streams may degrade downstream water quality and aquatic habitats; culverts, other alterations within right-of-way may affect upstream and downstream hydrology; potential effects on floodplains from additional impervious cover associated with induced development	Future development could lead to decline in water quality, subject to BMPs and other water quality controls.	Potential for increased storm water runoff and pollutants entering waterways. Publicly funded transportation projects would have to comply with Clean Water Act regulations.	Assuming regulatory compliance, future potential impacts to the area's waters of the U.S. and wetlands should result in no net loss. Although water quality would continue to decline slightly due to development, the proposed project would not contribute to significant cumulative impacts to the area's waters of the U.S.	Assuming regulatory compliance, there would be a slight decline in water resources.

Table 53 Summary of Potential Cumulative Effects (continued)						
Resource	**Proposed Alternative**		**Other Actions (Direct and Indirect Effects)**		**Potential Cumulative Effects**	**Health of the Resource**
	Direct Effects	**Indirect Effects**	**Regional Development**	**Transportation**		
Vegetation and Wildlife (including threatened and endangered species)	Alternative D would impact 373.17 acres of vegetation, 206.85 of which are forested and Alternative G would impact to 394.55 acres of vegetation, 196.63 acres of which are forested. Potential impacts to state-listed threatened and endangered species habitat	Potential loss of forests, wildlife habitat due to induced development; spread of non-native or invasive species. Potential impacts to state-listed threatened and endangered species habitat	Future land development could further reduce the amount of vegetation and wildlife habitat available in the area.	For public projects, vegetation/habitat converted to transportation land uses subject to compensatory mitigation for impacts protected by regulations (MOU).	Some loss of vegetation/wildlife habitat resources would occur due to increasing development, subject to regulatory controls such as MOU between TPWD and TxDOT.	Assuming regulatory compliance and compensatory mitigation where applicable, there would be a slight decline in wildlife and vegetation.
Archeological Sites	6 (Alt. G) to 7 (Alt. D) known archeological sites impacted	Indirect impacts to archeological sites would be limited to the project right-of-way (the APE established by the Programmatic Agreement [PA-TU]).	Potential exists for impacts to recorded or unrecorded sites. Impacts could be mitigated for projects on public land or those requiring federal or local permitting.	Potential exists for impacts to recorded or unrecorded sites. Projects on public land or requiring federal funding or permits would be subject to regulatory protection.	Some site loss would likely occur; however, mitigation opportunities would be available for most development.	Relatively stable, assuming mitigation occurs on development subject to regulatory oversight.

VI.I.3. Vegetation and Wildlife

Cumulative impacts to vegetation and habitat related to state and federally funded roadway projects, including the proposed Lindale Reliever Route, would be to some extent avoided, minimized, and mitigated in compliance with the TxDOT-TPWD MOA. Additionally, USFWS and TPWD regulatory protections of species of concern would be applicable for private as well as public projects.

VI.I.4. Archeological Resources

Depending on the proposed construction alternative, current field investigations indicate that seven (Alternative D) or six (Alternative G) known archeological sites would be directly impacted by the proposed undertaking. These include historic domestic sites and scatters, prehistoric lithic and ceramic scatters, and prehistoric lithic scatters. The undertaking's direct effects on these sites are being coordinated with TxDOT Environmental Affairs and ultimate determination of their significance is yet to be finalized. Some portions of the project's APE have not been surveyed. As such, a complete quantification of impacts to archeological sites cannot be calculated until such study is completed.

Future impacts to archeological sites from development within the RSA could occur through increased private development that would affect sites directly or indirectly, through increased discharge and runoff to creeks, thus triggering erosion and flooding. Publicly funded projects would be subject to the ACT and/or Section 106 of the NHPA, requiring agencies to identify and mitigate potential adverse effects to cultural resources.

VI.J. Summary of Cumulative Impacts

The direct and indirect effects of the proposed project would result in minor contributions to the cumulative impacts on resources analyzed in this section. The resources analyzed herein are expected to remain stable, taking into consideration the slight decline in water quality and the quantity and diversity of wildlife habitat that occurs in urbanizing areas, assuming that current regulatory mechanisms are followed and remain in place to protect resources potentially affected by development.

VII. Agency Commitments and Mitigation Recommendations

VII.A. Agency Comments

Agency correspondence and comments received in response to preliminary project coordination letters requesting input are included in **Appendix E**.

VII.B. Recommendations for Mitigation

FHWA statutory and regulatory requirements for mitigation are set forth in Title 23 U.S.C. Highways, Chapter 1 Federal Aid Highways, Section 109(h); and 23 CFR Sec. 771.105, Policy. The latter rule states, in part: "It is the policy of the Administration that… (d) Measures necessary to mitigate adverse impacts be incorporated into the action. Measures necessary to mitigate adverse impacts are eligible for Federal funding when the Administration determines that: (1) The impacts for which the mitigation is proposed actually result from the Administration action; and (2) The proposed mitigation represents a reasonable public expenditure after considering the impacts of the action and the benefits of the proposed mitigation measures…"

Project impacts fall into two basic categories: community impacts and impacts on the physical environment. Potential community impacts include alteration of current land use patterns, loss of pasturelands, economic impacts, relocation of homes and businesses, and degradation of visual resources/aesthetics. Potential impacts on the physical environment include contamination of surface and groundwater, destruction of wetlands, disturbance of native vegetation and wildlife, impacts to archeological and historic resources, floodplain encroachment, and increased transport of hazardous materials resulting from both construction and operations phases. Regarding cultural resources, recommendations concerning mitigation of adverse effects are forthcoming, pending TxDOT and THC review of the October 2012 report of the testing investigations at Sites 41SM388 and 41SM393 and the results of the eligibility testing that would be required for Sites 41SM394 and 41SM395.

Several impact categories are not included in the mitigation summary, as the assessment concludes that little or no impacts are anticipated. The proposed Lindale Reliever Route project has been shown to have minimal or no effect on mineral resources, air quality, and historic structures. Currently no rare, threatened, or endangered species have been found in the project area.

VII.B.1. Operations Phase Mitigation

An individual permit for impacts to waters of the U.S. and wetlands is anticipated in order to comply with Section 404 of the Clean Water Act. The Tyler District would apply for a permit prior to construction pursuant to its MOA with resource protection agencies regarding the Anderson Tract Mitigation Project for Highway Impacts to Wetlands Requiring Department of the Army Permits (TxDOT, 1994). The MOA outlines the objectives for the determination of mitigation under the Clean Water Act Section 404(b)(1) guidelines and provides guidance to USACE and EPA personnel for implementing the guidelines. These regulations must be adhered to when considering mitigation requirements for standard permit applications and would be followed in the course of the proposed project. Some specific mitigation measures which may be mandated include: careful design and spacing of bridge supports to assure the unimpeded flood control function of the wetland, mobility restrictions for heavy construction vehicles to prevent excess soil compaction, and re-seeding of native vegetative species after construction to prevent erosion.

The preferred sequence in the wetland mitigation process is:

- avoidance of impacts to wetlands;
- minimization of any unavoidable impacts to wetlands; and
- compensatory mitigation for unavoidable adverse impacts which remain after all appropriate and practicable minimization has been effected.

Compensatory mitigation for impacts to vegetation/wildlife habitat was considered during project planning in accordance with Provision (4)(A)(ii) of the TxDOT-TPWD MOU and the MOA. The MOA designates the following habitat categories for which TxDOT will consider compensatory mitigation:

- Habitat for federal candidate species (impacted by the project) if mitigation will assist in the prevention of the listing of the species;
- Rare vegetation series (S1, S2, or S3) that also locally provide habitat for a state-listed species;
- All vegetation communities listed as S1 or S2;
- Bottomland hardwoods, native prairies, and riparian sites; and
- Any other habitat feature considered locally important that the TxDOT District chooses to consider.

The preferred alternative would not result in the removal of bottomland hardwood, native prairie, or locally rare or important vegetation or habitat features. Between 5.77 acres (Alternative G) and 8.08 acres (Alternative D) of riparian vegetation would be impacted by the proposed project. This impacted riparian vegetation community extends outside the project area and would not be considered locally rare or unique. The preferred alternative also impacts other common forest

and grassland habitat types that are traditionally not considered locally rare or important. For these reasons, compensatory mitigation is not anticipated for this project under the current TxDOT-TPWD MOU. Mitigation measures would include avoiding and minimizing impacts to as much of the existing natural vegetation as possible. As of the date of this DEIS, there are changes being considered to the existing MOU that might require closer consideration of mitigation for vegetation and wildlife habitat impacts.

No long-term water quality impacts are expected as a result of the proposed project. Construction activities would require compliance with the State of Texas Water Quality Certification Program. The project would impact more than three acres of waters of the U.S. The Tier II 401 Certification Questionnaire and Alternatives Analysis Checklist would be completed and submitted to the TCEQ. Compliance with Section 401 of the Clean Water Act requires the use of BMPs to manage water quality on sites affecting jurisdictional waters. The SW3P would include at least one BMP from the 401 Water Quality Certification Conditions for Nationwide Permits (TCEQ, 2002). These BMPs would address each of the following categories: 1) erosion control, 2) post construction total suspended solids (TSS) control, and 3) sedimentation control.

Each of the build alternatives crosses two creeks, Stevenson Branch and Davis Branch, located within mapped floodplains, thereby impacting the 100-year floodplain. Smith County is a participant in the National Flood Insurance Program (NFIP). If the project is determined to cause an increase in the base flood elevation greater than one foot or causes any encroachment on a regulatory floodway, project engineers would be required to notify all National Flood Insurance Program participants. If the base flood elevation would be increased by greater than one foot, Smith County would have to grant approval before the project would be allowed to proceed. If approved by Smith County, FEMA would then be notified. The notification to FEMA would include the project's effects on the base flood elevations and any encroachments on the regulatory floodway. FEMA typically requires an engineering study to show the effects of the project on the base flood elevation. Detailed hydraulic studies would be conducted during final project design and any required coordination with local officials would be accomplished prior to the initiation of construction.

Hydraulic studies to properly size all highway-associated drainage structures, bridges to span watercourses, and the elevation of the roadbed at the approaches to bridges are examples of mitigation measures intended to minimize roadway impacts to the floodplains.

The proposed project is intended to improve area traffic access and relieve congestion, thereby increasing roadway safety. In addition, TxDOT has committed to incorporate the most current design measures to enhance vehicular safety. The proposed roadway, with grade separations and

controlled access, is a much safer design than the travel routes currently used by hazardous material transporters.

VII.B.2. Construction Phase Mitigation

Several impacts associated with the proposed alternative alignments are a direct result of the construction phase. Construction phase air quality impacts result mostly from fugitive dust generated by activities such as land clearing and earth moving. Fugitive dust can be controlled by watering the construction site and by limiting soil disturbance to those areas absolutely necessary for construction. Construction phase water quality impacts result mostly from sedimentation and erosion. These processes can be minimized by balancing a rapid construction schedule with prompt installation of erosion control BMPs, restricting construction traffic to crushed stone access drives, limiting disturbance to natural vegetation, and prompt re-vegetation at the conclusion of the construction phase. Additionally, erosion and sedimentation controls would be coordinated with the EPA and TCEQ. These controls include temporary holding ponds, silt fences, diversion dikes, rock berms, sediment containment ponds, and application of mulch netting and synthetic matting.

Clearing of vegetation would be limited and/or phased to maintain a natural water quality buffer and minimize the amount of erodible earth exposed at any one time. Upon completion of earthwork operations, disturbed areas would be restored and reseeded according to TxDOT's Vegetation Management Guidelines and in compliance with the intent of the FHWA Executive Memorandum on Environmentally Beneficial Landscapes and the FHWA E.O. on Invasive Species. This DEIS will be reviewed by the TPWD as part of the MOU between TxDOT and TPWD. Among other resource agencies, the TPWD has been involved with this project through the planning process and will provide comments on the project impacts to natural resources.

The greatest potential for adverse impacts to surface water exists during the construction phase of the project due to the quantity of soil being disturbed. This project would disturb more than five acres of land; therefore, TxDOT and the contractor would be required to comply with the Texas Pollutant Discharge Elimination System (TPDES) General Permit for Construction Activities. This program seeks to control erosion and sedimentation from construction projects by means of the promulgation of a Stormwater Pollution Prevention Plan (SW3P) that must be written by the engineer or contractor and implemented prior to beginning construction. The program consists of both management and structural BMPs such as use of vegetated roadsides in order to keep pollutants from receiving waters. These controls are required to be put in place to slow the flow of water from the site and prevent the loosening and transport of soil particles from the site during construction. In order to comply with the regulations, an engineer or contractor is required to keep the SW3P available for inspection at the construction site and submit the NOI to TCEQ prior to beginning construction. Following the completion of construction, a Notice of

Termination (NOT) must be submitted to the TCEQ declaring that all BMPs were followed and that the project was in compliance with the TPDES requirements. The proposed project would comply with all applicable measures mandated by these regulations.

To minimize impacts to water quality during construction, the proposed project would utilize temporary erosion and sedimentation control practices outlined in standard construction documents including TxDOT's Standard Specifications for the Construction of Highways, Streets, and Bridges. Where appropriate, these temporary erosion and sedimentation control structures would be in place prior to the initiation of construction, would be maintained throughout the duration of the construction, and left in place until vegetated cover is substantially in place.

BMP design decisions are not finalized at this time but would be chosen from TCEQ approved options. It is likely that temporary vegetation, sodding and/or mulching would be utilized for erosion control and silt fencing, stone outlet sediment traps and/or sediment basins would be used for sedimentation control.

All migratory birds in the U.S. are protected by federal statute, the Migratory Bird Treaty Act of 1916 (16 USC § 703-711). Migratory birds are protected from harassment, capture, possession, trade or sale, injury, and taking (killing) by this legislation. Habitat protection is not included in this statute. Migratory birds may arrive in the project area to breed during construction of the proposed project. TxDOT would take measures to avoid impacts to migratory birds, ground nesting birds, their nests or their young. A primary strategy would include scheduling vegetation clearing in fall and early winter months to avoid impacts to nesting birds.

TxDOT construction phase specifications provide contractors and supervising engineers with detailed guidance for the implementation of protective measures. These standard and special specifications include sodding for erosion control, seeding for erosion control, soil retention blankets, landscape planting, and temporary erosion, sedimentation, and environmental controls.

Construction phase noise impacts can be mitigated by limiting work to daytime hours and by maintaining adequate muffler systems for equipment. A copy of the traffic analysis associated with this project would be made available to local officials. On the date of notice of availability of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project. To minimize any harm to public safety during construction, one lane of traffic should remain open at all times, work should be completed during off-peak hours, and flag persons, signs, and barricades should be utilized.

VII.B.3 Environmental Permits, Issues, and Commitments (EPIC)

To ensure that mitigation commitments identified in the environmental impact assessment and permitting processes are carried through project design, construction, and inspection phases, TxDOT has established the EPIC system, which is set forth in the agency's "Plans, Specifications, and Estimates (PS&E) Preparation Manual: Plan Set Preparation (http://onlinemanuals.txdot.gov/txdotmanuals/pse/plan_set_preparation.htm#i1025409). The EPIC plan sheet must be included in the construction plan set, and will list all environmental commitments, issues and conditional requirements affecting the contractor and their work on that specific project. The sheet can be supplemented by specific details shown on other plan sheets but the areas of concern should be shown on the EPIC for the contractor's information. This sheet is specific to the project and should address areas the contractor should be aware of. Late changes to commitments that affect contractor work requirements are to be included in the PS&E by an addendum.

The EPIC sheets will include mitigation commitments identified in the project EIS and Record of Decision (ROD), as well as other commitments and mitigation requirements resulting from environmental permits, agency concurrences, and landowner agreements concluded during the project design and right-of-way phases.

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IX. List of Abbreviations and Glossary

AADT – Average Annual Daily Traffic

ACHP – Advisory Council on Historic Preservation

ACS – American Community Survey

ACT – Antiquities Code of Texas

ADT – Average Daily Traffic

Alignment alternatives – primary project alternatives (Alternative D, Alternative G, and the No Build), as recommended by the 2007 Corridor Study Report and examined in detail in this DEIS.

AOI – Area of Influence

APE – Area of Potential Effect

AST – Above Ground Storage Tank

BG – Block Group

BMP – Best Management Practice

CAA – Clean Air Act

CAAA – Clean Air Act Amendments

CAAP – Clean Air Action Plan

CCC – Civilian Conservation Corps

CEQ – Council on Environmental Quality

CERCLIS – Comprehensive Environmental Response, Compensation, and Liability Information System

CMP – Congestion Management Process

Corridor alternatives – preliminary project alternatives consisting of 1,000-foot corridors, as discussed in the 2007 Corridor Study Report; at this stage in the project, the corridors were evaluated in detail, with regard to engineering and environmental criteria.

CR – County Road

CT – Census Tract

Cumulative effects – effects "on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (NEPA, Section 1508.7, 1978).

CWA – Clean Water Act

DBH – Diameter at Breast Height

DEIS – Draft Environmental Impact Statement

DHHS – Department of Health and Human Services

Direct Effects – "caused by the action and occur at the same time and place" (40 CFR § 1508.8).

DOT – Department of Transportation

EA – Environmental Assessment

E-A – Encroachment-alteration Effects

EAC – Early Action Compact

EDC – Economic Development Corporation

EDR – Environmental Data Resources, Inc.

EHA – Espey, Huston and Associates

EIS – Environmental Impact Statement

EISA – Energy Independence and Security Act of 2007

E.O. – Executive Order

EOR – Element of Occurrence Records

EPA – U.S. Environmental Protection Agency

EPIC – Environmental Permits, Issues and Commitments

ERNS – Emergency Response Notification System

ETJ – Extra-territorial Jurisdiction

FEMA – Federal Emergency Management Agency

FHWA – Federal Highway Administration

FIRM – Flood Insurance Rate Map

FM – Farm-to-Market Road

FPPA – Farmland Protection Policy Act

HOV – High Occupancy Vehicle

HUD – Housing and Urban Development

IG – Induced Growth Effects

IH – Interstate Highway

Indirect Effects – "caused by an action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR § 1508.8).

IP – Individual Permit

IRIS – Integrated Risk Information System

LACC – Lindale Area Chamber of Commerce

LEP – Limited English Proficiency

Loop 49 East – proposed project currently under study; extends from Loop 49 South at SH 110 north to IH 20 in the vicinity of SH 155.

Loop 49 North – proposed project described in this DEIS; also referred to as the Lindale Reliever Route; limits are from Loop 49 West/IH 20 intersection north to US 69 north of Lindale

Loop 49 South – existing toll facility located south of Tyler and extending from SH 155 east to SH 110

Loop 49 West – planned toll facility; project is approved and construction is planned; extends from Loop 49 South at SH 155 north to IH 20 (northwest of Tyler)

LOS – Level of Service

LQ –Location Quotients

LUST – Leaking Underground Storage Tank

MOA – Memorandum of Agreement

MOU – Memorandum of Understanding

MPH – Miles per Hour

MPO – Metropolitan Planning Organization

MSATs – Mobile Source Air Toxics

MTP – Metropolitan Transportation Plan

NAAQS – National Ambient Air Quality Standards

NAC – Noise Abatement Criteria

NATA – National Air Toxics Assessment

NCHRP – National Cooperative Highway Research Program Report

NCHRP 466 – NCHRP Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects

NDD – Natural Diversity Database

NEPA – National Environmental Policy Act

NET RMA – North East Texas Regional Mobility Authority

NFIP – National Flood Insurance Program

NHD – National Hydrography Dataset

NHPA – National Historic Preservation Act

NOA – Notice of Availability

NOI – Notice of Intent

NOT – Notice of Termination

NPL – National Priority List

NRCS – Natural Resources Conservation Service

NRHP – National Register of Historic Places

NRI – Natural Resources Inventory

NWI – National Wetland Inventory

NWP – Nationwide Permit

OHWM – Ordinary High Water Mark

OTHM – Official Texas Historical Marker

PADS – PCB Activity Database System

PA-TU – Programmatic Agreement for Transportation Undertakings

PCN – Pre-construction Notification

PM – Particulate Matter

RAATS – RCRA Administrative Action Tracking System

RAP – Relocation Assistance Program

RCRA – Resource Conservation and Recovery Act

RCRIS – Resource Conservation and Recovery Information System

Reasonably foreseeable – effects are "sufficiently likely to occur that a person of ordinary prudence will take them into account in making a decision" (NCHRP, 2002).

ROD – Record of Decision

Route alternatives – preliminary project alternatives consisting of 1,000-foot corridors, as discussed in the 2001 feasibility study; at this stage in the project, route alternatives were determined based on the identification of initial environmental constraints

RSA – Resource Study Area

RTHL – Registered Texas Historic Landmark

SAFETEA-LU – Safe, Accountable, Feasible, Efficient Transportation Equity Act: A Legacy for Users

SAL – State Archeological Landmark

SCAD – Smith County Appraisal District

SH – State Highway

SHPO – State Historic Preservation Officer

STIP – State Transportation Improvement Program

SW3P – Stormwater Pollution Prevention Plan

T&E –Threatened and Endangered

TAQA –Traffic Air Quality Analysis

TARL – Texas Archeological Research Laboratory

TCEQ – Texas Commission on Environmental Quality

TCMP – Texas Coastal Management Program

TDM –Travel Demand Management

THC – Texas Historical Commission

TIP – Transportation Improvement Program

TMA –Transportation Management Area

TPDES – Texas Pollutant Discharge Elimination System

TPWD – Texas Parks and Wildlife Department

TRI – Toxic Chemical Release Inventory

TSS – Total Suspended Solids

TSWQ –Texas Surface Water Quality Standards

TWC – Texas Workforce Commission

TWDB – Texas Water Development Board

TxDOT – Texas Department of Transportation

TxNDD –Texas Natural Diversity Database

US – U.S. Highway

USACE – U.S. Army Corps of Engineers

USDA – U.S. Department of Agriculture

USFWS – U.S. Fish and Wildlife Service

USGS – U.S. Geological Survey

UST – Underground Storage Tank

VFW – Veterans of Foreign Wars

VMT – Vehicles Miles Traveled

vpd – Vehicles per day

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